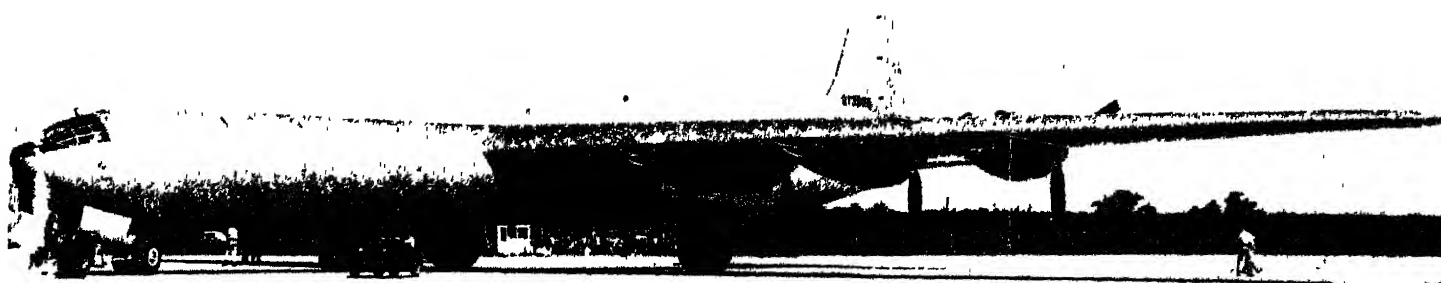


SCIENCE NEWS LETTER



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MEDICINE

Phosphorus 32 for Cancer

Atomic research by-product successful for first time in treating superficial skin cancers and warts. Other cancer treatments by radioactive substances a possibility.

► **CANCER TREATMENT** by atomic research by-products is now a reality for two types of the disease, a University of California Medical School physician reported at the meeting of the American Radium Society in San Francisco.

Successful treatment was reported by Dr. Bertram V. Low-Beer, associate professor of radiology, who has been working quietly since 1941 with radioactive phosphorus produced in the University of California cyclotrons.

Dr. Low-Beer cautioned that the treatment is applicable only to superficial skin cancers and warts, and held no hope that it could be applied to deep-seated tumors in the near future.

The two types of skin cancer treated successfully are basal cell carcinoma and hyperkeratosis, which are not rapidly spreading, fatal types. In cases of basal cell carcinoma Dr. Low-Beer's treatment was 98% effective, tumors being removed in 51 of 52 patients; for hyperkeratosis, the treatment was 100% effective in 36 cases. A total of 301 patients with cancer and warts were treated. An additional 100 have been treated but have been observed only briefly.

Dr. Low-Beer refused to express an opinion whether the treatment is superior to X-rays, radium and surgery for the same afflictions, but did say it is as good as any to be had.

He observed that while the possibilities of cancer treatment with radioactive substances have been widely discussed as one of the major potential applications of atomic research, this was the first time actual treatment had been perfected and proved.

The treatment is an excellent illustration of the theory of possible treatment of cancer with artificially radioactive substances, and it brightens the future in this field.

For a number of years it has been thought that radioactive phosphorus, isotope 32, would prove ideal in treatment of skin cancer. This isotope emits only beta particles, which cannot penetrate tissue to greater depth than under layers of skin, about 8 millimeters. Therefore radiations from phosphorus placed

on the skin will destroy the skin cancer cells, but not the healthy body cells beneath.

On the other hand, both X-ray and radium, the latter emitting powerful gamma rays as well as beta particles, are deeply penetrating, and destroy some healthy tissue. Dr. Low-Beer proved the theory to be correct in the case of phosphorus, devising a method of treatment as simple as bandaging a skin cut. One of his first problems was to make radiation over the skin tumor uniform. After trying to apply radio phosphorus with absorbent cotton, vaseline, lanolin, gum acacia, and higher alcohols, he found that the most satisfactory technique is to put a liquid solution containing the isotope on ordinary blotting paper with an eyedropper.

The physician then cuts the blotting paper to fit the tumor, and it is applied like a bandage with adhesive tape. The blotting paper remains on the tumor up to five days, depending on the amount of radiation needed. At the end of that time an erythema, or red blotch appears, increases in intensity, and gradually disappears along with the tumor. The skin is clear, though sometimes a slight dimple remains as a souvenir.

Before treating human subjects, extensive experiments were conducted to determine dosage needs and effect on tissues of radiations.

Science News Letter, July 6, 1946

CHEMISTRY

Fluorine Makes Many Developments Possible

► **FLUORINE**, a chemical element discovered 133 years ago, has just gone on the market for the first time, with a promise of important new scientific developments ranging from more stable lubricants than any now known to wonder insecticides.

A gas, fluorine is now available in steel pressure cylinders for experimental use in industry and science, the Pennsylvania Salt Manufacturing Company announced.

One of the most chemically active of

the 96 known elements, fluorine combines rapidly with most other elements to form very stable compounds. Some of these compounds are in freons used as refrigerants, propellants for wartime insecticide "bombs" and dyes.

Here are some of the new products scientists predict will come from fluorine:

1. Stable lubricating oil that will not break down under any present engine operations and may make possible "dream" engines that require more stable lubricants than any now available.

2. Non-burning, non-poisonous liquid to replace mercury in the present mercury vapor boiler, making the most efficient vapor engine practical and safe.

3. A gas now known that requires fluorine to manufacture and which is a nearly perfect insulator for high voltages used in X-ray and nuclear physics.

4. An insecticide developed in Germany but impractical because of the cost may become available.

Other possibilities for fluorine include heat transfer and dielectric media, other insecticides, fungicides, fumigants, germicides, stable solvents, anesthetics, fire extinguishers and fireproofing materials, resins and plastics and weed killers.

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MARINE BIOLOGY

South Pacific Seas May Be Rich Food Source

► **THE WATERS** of the South Pacific ocean may become one of the great food producing areas of the world as soon as scientific exploration gives enough facts about unexpected hints as to their possible productivity.

As a result of the recent Pacific Science Conference held by the National Research Council in Washington, D. C., scientists are expecting to send expeditions to tropical sea areas traditionally considered less rich in fish and other life than the cooler waters of the world's oceans.

Below the surface where tropic waters are cooler there may be found great layers of "pasture" consisting of plankton, minute plants that make good food for fishes and crustaceans.

Great stretches of the sea around Sumatra, Java and Borneo may be as good shrimp fishing grounds as the Gulf of Mexico. Properly developed, these could play a major part in providing food to peoples that often do not have enough to eat.

Science News Letter, July 6, 1946

BIOLOGY—ATOMIC ENERGY

Atomic Effects at Bikini

Science Service writer at Bikini radios observations on bomb explosion and its probable effects on the targets and surrounding life.

By DR. FRANK THONE

Science Service Crossroads Correspondent

➤ A GLOW ALMOST as bright as the face of the sun and very much larger. Then a yellowish-pink cloud rising fast from the sea. Then around it a wall of what appeared to be spray thrown very high. That was the beginning of the explosion of the first test atomic bomb over Bikini Atoll, the moment for which the world has been waiting all summer.

The wall of spray subsided, but the glowing cloud climbed higher and higher. In a couple of minutes it had reached the flat base of a cumulus cloud that stood between it and us, who were watching from all possible points of vantage on the Appalachian. It kept on climbing, thrusting out tight cauliflower heads all the time, showing how the enormous energy was still boiling within it.

At the end of nine minutes it was 24,000 feet high and half that in diameter. At 15 minutes it had broken in half, with the upper part drifting away. A little longer, and the parts were lost in the rolling cumulus, that covered that part of the sky.

Awesome prophecies all failed of fulfillment. There was no tidal wave, no earthquake shock, no "setting the sea afire." The sound, when it reached us at our distance of 18 miles, was no louder than a battleship's broadside at that range.

For scarehead folks, a very "tame" show.

The explosion of an atomic bomb has been likened to what goes on in the interior of the sun. It has also been suggested that the end of the world or at least of the solar system might have been like such an explosion.

It strikes me that what we have just seen might be taken as a miniature picture of the beginning of the universe. Many scientists, especially astronomers, take seriously the theory of the expanding universe, because all the great star masses or galaxies appear to be rushing away from each other. It might well be called the exploding universe for the calculated speeds are the order of the leap of the first flame-jet from detonating TNT.

Especially significant contributions to this view have been made by Dr. Harlow Shapley, director of the Harvard College Observatory and president of Science Service. An American-educated, Belgian scientist, Canon Georges Lemaitre, not long ago completed the picture by running the figures back to a time before the universe started to expand. He calculated that time was not much more than two billion years ago. The matter and energy now distributed throughout the universe were all jammed into one super-atom.

That atom exploded, and the universe began to be. The explosion is still going on, flinging enormous star masses out to frontiers hundreds of millions of light-years from that primordial center of creation.

The tremendous explosions of matter that cause the sun and all the stars to give forth light and heat are mere sec-

ondary cracklings of this unimaginably immense cosmic detonation. Once in a while, a star will burst forth with many times its normal explosive power, and we have a nova.

Part of the explosive potential that was packed into what eventually became the element uranium was what we witnessed, from a safe distance, lest we be temporarily blinded by the flash. It was just a minor spark, unnoticeable on a cosmic scale, in the long story of an exploding universe.

The atom bomb's effect on Bikini's ecology will have a blurred record because DDT was sprayed wholesale over the atoll islands before Seabee forces went to work there weeks ago. This was done to abate the plague of flies that wrecked comfort and threatened health. Biologists making the "before-B day" survey objected but Navy authorities decided in favor of the Seabees.

DDT, as is well known, plays no favorites. It kills flies, mosquitoes and other pests, but also knocks down butterflies, moths, beetles, wild bees and almost all other insects that live above ground. Unable to capture native insects, entomologists will have to turn in an incomplete record. It is wholly possible that some of the victims of this necessary massacre are species unknown to science. Now they never can be known.

But this is only the beginning of the story. Services of some of these insects are needed by some species of plants to make the fertilizing transfer of pollen. If these species die out after the bombings or are sharply reduced in abundance, the scientists cannot be sure when they make their "after-B day" survey whether the change is due to the bomb's radioactive spraying or to the DDT spraying.

There may be effects on animal life too. Some birds and almost all lizards depend mainly on insects for food. Recent experiments indicate that DDT-poisoned insects do not kill birds and fishes that eat them but if the insects are killed off, where will the birds find food?

Thus this one monkey-wrench, thrown into this atoll's ecology, sprinkles question marks all over the biological record.

Biology Effects Local

Biological effects of the atomic bombings at Bikini were strictly local. These were predicted: The enormous but concentrated heat will flash the water into steam over an unknown but not large area in the lagoon, will heat the water above the level life can tolerate over a



Joint Army-Navy Task Force One radio telephoto, through Aeme

BIKINI—A few seconds after burst of the atomic bomb dropped from B-29, "Dave's Dream," atomic cloud boiled up over Bikini. This photo taken from sky bridge of Vice-Admiral W. H. Blandy's flagship, USS Mt. McKinley, on July 6.

somewhat greater space; fish in those areas will die, and so will lower forms of life. Concussion will probably do more damage than the heat.

One thing that certainly will happen, at least on the second explosion, will be the stirring up of a great cloud of bottom silt. The water in the atoll may remain turbid for days. Fish that survive it can swim away; but the fixed forms of life like coral animals, and others like crabs and sea-cucumbers and bottom-burrowing worms will have to stay and take it. Silt can smother if it drifts down thickly enough; if it has been made radioactive it can do worse.

The second explosion will probably throw much radioactive spray and perhaps a wave of silt-bearing radioactive water over the low islands, strung like scattered beads on the atoll's ring of reefs. Possible effects on land life are hard to estimate in advance.

Weird Evolution Unlikely

Expectations that radiations from the atom will cause a lot of weird evolutionary changes among the plants and animals of Bikini atoll are somewhat over sanguine. Enough is already known, from experiments with radium, X-ray and other forms of radiation in the breeding of animals and plants, to justify this assertion.

Radiations from the bombs are essentially the same in nature, differing only in intensity. But the effect of overdoses of X-rays or radium is already known. They simply kill. The effect of lesser but still excessive doses is also known. They permit the production and fertilization of eggs, but these fail to hatch. "Radiation in moderation" might well be the watchword for the experimental breeder.

There is another angle; to know whether you are getting new varieties of plants or animal life, you have to know a good deal about the ancestral stock. That is known, with considerable thoroughness, about the package of seeds and mold spores that will be exposed to the atom-bomb radiations. But it is not known about the fish and other sea creatures in the lagoon, or about the coconut and pandanus trees and other plants on the shore, among them. If biologists, coming ashore at Bikini in the years after the blasts, find new plant and animal varieties they will be hard put to judge whether these are results of atomic radiations or chance-occurring mutations that would have turned up anyway.

It would be much more profitable if

biologists having access to plant and animal stocks of known ancestry could get even a little uranium 235 or plutonium to use under controlled conditions in their own laboratories and greenhouses. It is to be hoped that, say, enough to blow up in one bomb may be made available before long for such constructive purposes.

May Aid Cancer Research

Cancer research may get some help from the atomic bomb explosions at Bikini.

Some of the 400 rats and 120 mice exposed are of hereditary types known to be susceptible to cancer. Those that survive will be watched closely, and their cancer records compared with those of similar animals that have not experienced atomic bombing.

Some of the goats aboard the target vessels had their hair clipped to simulate human haircuts. Others wore flash-proof clothing, and still others were under flash screens.

Blood counts and examinations for blast effects will be made as promptly as possible after the first explosion to see what has happened to them.

Radioactive Water Feared

After uranium 235 and plutonium become available in sufficient quantities for civilian power plants, there will be a new worry for conservationists, Dr. Paul S. Galtsoff, veteran marine biologist of the U. S. Fish and Wildlife Service, says.

Dr. Galtsoff is one of a group of scientists representing the National Academy of Sciences at Bikini.

Power plants operating on radioactive piles will require great quantities of water for cooling purposes. The easiest way to get rid of this water after it has served its purpose is to let it run into the nearest river. But such water will be radioactive as well as hot, and both conditions can be very bad for fish and also for the small aquatic plant and animal forms that serve as natural fish foods.

Present atomic plants use elaborate safeguards to prevent spent cooling water from causing such trouble. These are expensive, of course, and the natural thing for commercial plants to do is keep costs as low as possible. So the old conflict over stream pollution may be re-enacted in a new field.

Coral to Cover Ships

I have been letting my imagination run ahead of the tests at Bikini—years ahead.

What is going to happen to the ships

after they are sent to the bottom by the two bomb blasts, one in the air above them, one in the water a little below?

Lie there and rust in the still salt water, until nothing is left but heaps of iron oxide—that might be the first idea to strike one.

But that notion reckons with the sea containing nothing but dead salt water. Nothing could be farther from fact. The sea is a living thing especially the parts of it that are shallow and warm as in the lagoon of an atoll.

All manner of living creatures will swarm aboard the sunken ships, as soon as quiet is restored in the lagoon and the deadly radioactivity has diminished to a life-tolerable level. (Turn to page 13)

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ALLERGY

Horse Has Skin Allergy

➤ THE FIRST case on record of allergic skin disease in a horse, such as some humans get from dyes in clothing or from cosmetics, was reported by Dr. Lester Reddin, of Pearl River, N. Y., and Dr. Donald W. Stever, of Hollidaysburg, Pa., at the meeting of the American College of Allergists.

The horse had been suffering for three years from a skin irritation of the head, neck and saddle region. Analysis and skin tests showed it was due to contact with a saddle soap and leather conditioner used on the saddlery.

The ingredients responsible were "wool yellow dye" in the saddle soap and sulfonated neatsfoot oil in the leather conditioner. Each of these was harmless when used alone, but when combined and applied to the horse's skin, tests were strongly positive.

Contact dermatitis has been produced experimentally in laboratory animals,

but so far as the doctors know, this is the first occurring otherwise.

The reason some persons develop allergies is that something goes wrong with the body's mechanism for forming antibodies, in the opinion of Dr. Hyman Miller and Dr. Dan H. Campbell of the California Institute of Technology.

Antibodies are most familiar to the layman as substances formed in the blood to fight invading disease germs. They may, however, also be formed to react with foreign proteins other than those from germs. People with allergies produce in their blood something similar to an antibody which is called a reagin.

From experiments reported at the meeting, the California scientists are "inclined to speculate that reagin represents the result of a distorted or incomplete antibody-forming mechanism" and that the reagin is probably a unipolar antibody.

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BIOCHEMISTRY

Body Changes in Fasting

➤ FROM A MAN who voluntarily fasted for 45 days has come new knowledge of how the chemical composition of the body is changed during such prolonged periods without food. Reporting to the meeting of the American Society of Clinical Pathologists, Dr. William Sunderman of the University of Pennsylvania called the studies "unique."

"We can find no record of similar ones having been undertaken toward the end of such a prolonged fasting period," he stated.

The faster, a 54-year-old man, was a religious zealot who had previously undertaken several shorter fasts. The idea of undergoing special examinations of scientific interest appealed to him but he would not enter the hospital for such studies until the last two days of his fast.

On the 45th and last day of the fast, his weight had dropped from a pre-fasting 137½ pounds to 97 pounds. Except for the last week he had lost no time from his work as silk twister. He claimed that he felt hungry all during the fast but that the hunger was greatest during the first week. He had no night blind-

ness and no numbness or tingling in feet and hands. He took water but no food.

The human body deprived of salt during prolonged fasting or in starvation can substitute bicarbonate for chloride. This is one of the significant findings reported by Dr. Sunderman. The body gets the bicarbonate from breakdown products in the course of using up body reserves.

The fasting man was able to remain active although the amount of chloride in his blood serum was reduced to almost half the normal. Such decreases are usually found in critical conditions such as the last stages of fatal cases of lobar pneumonia, intestinal obstruction with vomiting or in severe Addison's disease.

This man was compared with a patient suffering from anorexia nervosa. This is a nervous disorder in which the patient loses appetite and systematically eats little or no food. Finding an increase in the concentration of magnesium in the blood serum of both these interested the scientists because such an increase is seen in persons with injury to part of the brain called the hypothalamus

and in hibernating animals during hibernation.

Neither the anorexia nervosa patient nor the fasting man developed dropsy, and the total proteins in their blood remained normal. However, five days after he had broken fast there was a drop in protein concentration in his blood serum and he complained of a "tight" feeling over his knees, though no sign of dropsy could be seen.

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ENGINEERING

Asphalt in Concrete Gives Floor Elasticity

➤ HARD FLOORS, particularly concrete, are hard on the feet, everybody knows, but how they can be made springy or resilient is not common knowledge. It can be done, however, by the addition of asphalt to the cement mix before it is applied to the floor.

How the concrete-asphalt mix is made and applied was explained at the meeting of the American Society for Testing Materials at Buffalo by F. O. Anderegg of the John B. Pierce Foundation. The mix was developed by the foundation in its program of reducing costs and improving quality in building materials and methods.

"It has been found," he said, "that a combination of portland cement, asphalt and aggregate could be used in laying a floor which resists indentation much better than an asphalt floor, while markedly reducing the spine jarring impact of the straight cement concrete floor."

After experimenting with various mixtures of asphalt emulsions, it was found that concretes of satisfactory strength have been obtained in the range of 7½% to 12½% cement and with 2% to 3% emulsion.

The mix developed results in a system in which the asphalt is present as a "discontinuous phase," he explained. "The particles of asphalt as observed under the microscope are dispersed in the concrete in the same state of subdivision as in the emulsion added."

Several other emulsions besides asphalt were tried out in the experiments, Mr. Anderegg said. These included clay emulsions, protein emulsifiers, vinsol resin emulsions and others. "Emulsions made from high-penetration asphalts," he asserted, "are easily handled and seem to produce better workability and cushioning action."

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ENGINEERING

Doomed Wells Yield Again

➤ OIL WELLS suffering from the intrusion of natural gas can be returned to normal production with a "plastic plug" that seals the wells.

Sixty-six marginal or non-productive wells in west Texas have been tested with the "plug" and most of the doomed wells are now yielding about \$1,000 worth of oil each month, the Monsanto Chemical Company, St. Louis, and Oilwell Chemical Service Company, Fort Worth, Texas, have announced.

Used for sealing the wells from the unwelcome gas, a resinox phenolic resin has been successfully employed in wells as deep as 11,500 feet. The resin goes into the well as liquid and hardens after it permeates the porous rock through which the gas had been coming, it was explained.

State laws setting the amount of natural gas that can be taken from a well with each barrel of oil make the problem of keeping the gas quantity under control an important economic consideration in operating oil wells. As wells get older, a producer may find that he is getting all the gas allowed with fewer barrels of oil. Thus the new sealing plastic promises better returns from wells

that are plagued by a high ratio of natural gas to oil.

Of the 66 wells tested with the new "plug," only a few failed to respond with greater allowed oil production, and these few failures were attributed to experimenting and peculiar geological or mechanical conditions.

In the west Texas field alone it is estimated that between 4,000 and 5,000 wells have become marginal or non-productive because of an increased ratio of natural gas.

The remedial operation of sealing a well can be completed in 36 hours by a seven-man crew, it is reported.

"Plastic plugging" was developed by Fred R. Holland of the Oilwell Chemical Service Company and Monsanto's plastic division, Springfield, Mass.

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PETROLEUM CHEMISTRY

"Cat Cracker"

Gives More Gas

➤ A "CAT CRACKER" that has nothing to do with cats or crackers squeezes an average of two gallons more gasoline out of every barrel of crude oil at the Texaco refinery at Lockport, Ill.

Developed to process high octane gas-

oline components for aircraft, the new multi-million dollar catalytic cracking unit has the largest fractionating tower ever used on a "cat cracker."

Fifty-two men are required to operate the 12-story unit that now turns out 13,000 barrels of high octane automobile gasoline each day. Officials predict that the production rate can be upped to 20,000 gallons a day.

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MEDICINE

Ringworm Remedy May Be Good for Athlete's Foot

➤ A NEW REMEDY for ringworm of the scalp which may also be good for athlete's foot made its medical debut at the meeting of the American Medical Association in San Francisco.

Copper undecylenate is the chemical that may prove to be a double-barreled weapon against fungi that cause itching heads and bald spots on school children and itching, sore feet in children and adults.

Use as ringworm remedies of this chemical and of another, salicylanilide, used previously in industry for mildew-proofing, was developed by Dr. Louis Schwartz of the U. S. Public Health Service. Working with Dr. Schwartz in development of new treatments for ringworm and in their successful trials among school children at Hagerstown, Md., were Drs. Samuel M. Peck, Isadore Botvinick and Armond Leo Leibovitz and Miss Elizabeth S. Fraser, associate statistician of the Public Health Service.

Besides working out chemicals for successful treatment of ringworm of the scalp in children, these scientists showed in the Hagerstown trials that children need not be barred from school or the movies while their scalp infection is being treated. On the contrary, the Public Health Service scientists encouraged school attendance in order to have the children treated regularly and effectively every day. The treatments were given at the school. The hair is clipped short before treatment and the child wears a cap at school to prevent stray hairs falling and carrying the infection to others.

Success with copper undecylenate in clearing up scalp ringworm led the Crooks Laboratories, which manufacture the chemical, to inaugurate trials of it for ringworm of the feet. There is no reason, in Dr. Schwartz' opinion, why it should not succeed.

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PLASTIC PLUG—From the rig floor the truck can be seen pumping Resinox into the well. The pump (immediately behind the cab) is operated by a power take-off from the truck motor. Valves on the displacement truck measure the water pumped in after the resin to assure its being pumped to the bottom.

ENGINEERING

Wood and Metal Fatigue

➤ METALS and wood construction materials can get tired, too. Fatigue in metals and wood, an important engineering problem, was described to the American Society for Testing Materials.

Fatigue is the technical term applied to a gradual weakening in materials in use, even under ordinary working conditions, that may result in failure or breakage. When a sample is broken in a testing machine, breakage results when a sufficient load is applied. However, the same material will fail in use under a much smaller load if the load is applied and removed many times. A rail in a railway track, for example, is subjected to rapidly changing loads as the wheels of a train pass over it. Fatigue and fatigue limits are important factors that mechanical engineers must take into consideration in all designs.

Fatigue properties of several alloy steels as a function of hardness were discussed by Henry Hermann ZurBurg of the Chrysler Corporation. The smooth bar results of tests made by him, he said, show that the relationship between the endurance limit and hardness depends on the carbon analyses of the steel and is independent of the alloy content of the materials tested.

R. S. Jensen and H. F. Moore, of the University of Illinois, reported on fa-

tigue tests made on T-shaped specimens cut from a rail web under cycles of stress varying from compression stress to tensile stress 20% as great as the compression stress. The testing device used was a vibratory machine. The fractures for such specimens started on the compression side of the specimen and the compressive stresses were about 78% higher than the stresses in specimens subjected to completely reversed bending stresses.

J. A. Bennett of the National Bureau of Standards reported on a group of tests with smooth specimens in which a method was developed of expressing damage independent of stress. This permitted the direct addition of damage occurring at different stresses. The reliability of the methods was checked by testing specimens after fatigue loading at two or more different stresses.

An understanding of the fatigue behavior of wood and glued wood construction has required the development of proper testing machines and testing procedures, W. C. Lewis of the U. S. Forest Products Laboratory stated. Some of the techniques and test methods have been perfected, he said, and a significant number of tests have been made in bending, tension parallel to the grain, and shear, on specimens of wood, plywood, and wood with glued joints.

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NUTRITION

Nutrient X, New Vitamin Makes Diet Palatable

➤ A PALATABILITY vitamin was reported by A. M. Hartman and C. A. Cary, of the U. S. Department of Agriculture, at the meeting of the American Dairy Science Association. The new vitamin's only name, so far, is Nutrient X, signifying that scientists do not yet know its chemical nature.

It is found in several milk products, lettuce, egg yolk, beef and pork muscle, alfalfa and blue grass and alfalfa and timothy hays. It is not present in whole wheat flour, white flour, enriched white flour, yeast, cornmeal, soybean oil meal, linseed oil meal or heat coagulated egg white. Liver extract used in treatment of pernicious anemia is a rich source of Nutrient X.

The palatability which it confers on diets is not just a matter of taste of food items but of the body's needs for the particular food and the use the body makes of it. The substance is so essential, the scientists report, that rats on a relatively high protein diet usually died if Nutrient X was lacking but lived and grew 85% of normal if the same diet was supplemented with X.

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METALLURGY

Copper and Zinc Reserves Very Low

➤ COPPER PENNIES, now rapidly replacing the wartime substitutes, may not be the common coins a generation from now. The reason is that the U. S. may run out of copper by then.

Elmer Pehrson, chief of the economics and statistics service of the Bureau of Mines, estimates that, on the basis of the country's rate of consumption of copper for the five years before the war, copper reserves will only last another 33 years. If there aren't enough copper pennies then, the zinc-coated coins that were used during the war won't be the answer, because the life of zinc reserves is listed as only 18 years.

Urging stockpiles of our metal reserves, Mr. Pehrson warns that some other metals are going to run out before copper and zinc. Bureau of Mines estimates place reserves of mercury at only two years; tungsten and antimony, three years; vanadium, six years; and lead, 11 years.

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MEDICINE

Ultraviolet Rays Kill TB Germs in Air

➤ IF HUMAN BEINGS react like rabbits, they can be protected from tuberculosis germs in the air by an anti-germ barrage of ultraviolet rays.

These rays kill tuberculosis germs suspended in the air, Dr. Max B. Lurie, of the Henry Phipps Institute, Philadelphia, reported at the meeting of the National Tuberculosis Association.

Suitable ultraviolet irradiation of the air, he further reported, completely protected rabbits from an airborne contagion of tuberculosis so severe that it killed 73% of rabbits of the same ancestry exposed to the same tuberculosis contagion within the same period of one year.

The ancestry of rabbits plays a part in their getting or not getting tuberculosis. Some bunny families have no resistance to attack by the germs but con-

siderable resistance against the progress of the ensuing disease. Another family has considerable resistance against attack by germs in the air but little resistance against the engrafted tuberculosis.

Increasing the concentration of tuberculosis germs in the air increases proportionately the number of cases, speeds the onset of the disease and affects its essential character in rabbits of high genetic resistance. For rabbits of families of low resistance, increasing the germ concentration in the air increases the number of cases but the disease is always uniformly, rapidly progressive in animals of these families.

Normal guinea pigs placed in a room housing tuberculous animals get severe tuberculosis. The contagion is uniformly distributed by the air in the room without regard to the location of the animals that are the sources of the infection.

Science News Letter, July 6, 1946

MILITARY SCIENCE

Most Chemical Casualties Occurred During Tests

➤ **POISON GAS** casualties among American troops during the war were not numerous and those that did occur were all far from any fighting front and were caused by our own chemical weapons. These casualties occurred on the proving grounds where chemical warfare equipment was being tested.

Dugway Proving Ground, out on the barren salt flats of Utah, had a unique record in that respect. While chemical casualties were fairly frequent, most of the small number of fatalities that occurred there might have happened to civilians anywhere—they were due to automobile accidents.

Most of the injuries from phosgene, mustard gases and flying bomb fragments were incurred by scientists and soldiers in the course of necessary tests. One scientist was wounded when 11 half-ton phosgene bombs were exploded only 60 yards from where he was operating his testing equipment. Another caught a bomb blast on his left side so severely that his skin bore the imprint of his buttons and metal insignia for days afterwards, and he lost the hearing in his left ear.

One incidental discovery in zoology was made in the course of the tests: poison gases have no effect on rattlesnakes.

Science News Letter, July 6, 1946

AERONAUTICS

XB-36, Giant Army Bomber, Undergoing Ground Tests

See Front Cover

➤ **IN SIZE** the new Army giant land-based bomber, the XB-36, is roughly 40% larger than the famous B-29 Superfortress that did so much in bringing Japan to her knees. Its engines deliver more than twice as much power. In performance much is expected, but little is known because this super-super plane is still on the ground.

Construction of the new giant is completed and the plane is now under ground and taxi tests. Its first flight is scheduled for later in the summer. It was built at the Fort Worth, Texas, plant of the Consolidated-Vultee Aircraft Corporation. It was designed and constructed under Army supervision.

The picture on the front of this

SCIENCE NEWS LETTER shows the XB-36 on the testing field at the Consolidated-Vultee Corporation.

For comparison, the XB-36 has a wing span of 230 feet, and the B-29 a span of 141 feet. The fuselage of the new giant is 163 feet long; that of the superfortress, 98 feet. The new plane is powered with six Pratt-Whitney 3,000 horsepower engines; the older plane, with four engines delivering together 8,800 maximum horsepower thrust. The XB-36 is equipped with pusher-type propellers, set in the after part of the wings. It needs 15 men in its crew.

In comparison with the mighty Navy Mars, for long the largest flying boat, the XB-36 has a wing span 30 feet greater, and is 46 feet longer. The Glenn L. Martin cargo boat, now retired, was powered by four Curtiss-Wright engines. It was launched Nov. 8, 1941, and after severe tests went on active duty with the Navy Air Transport Service two years later. Its 15 months on the Pacific, crossing and recrossing from California to Hawaii, was a notable war service. On a trip from Brazil to Trinidad it carried a total cargo of 35,000 pounds.

It is predicted that the new Army bomber will be considerably faster than the B-29, or the Mars, have a much greater range, and be able to carry heavier loads of men or bombs.

Science News Letter, July 6, 1946

ARCHAEOLOGY

Pre-Inca Empire Being Dug From Viru Valley

➤ **THE STORY OF** people that lived in northern Peru centuries before the Inca Empire that the Spaniards overthrew is being literally dug out of the Viru Valley as archaeologists embark on the most intensive studies yet made in South America.

A group from Columbia University, New York, has already discovered an important link between the pre-pottery people of the valley and the Chavin. The Chavin layer of pottery is estimated to date back to 500 A.D., while the pre-pottery people were even earlier.

Dr. William Duncan Strong, chairman of the Institute of Andean Research that is conducting the work in the Viru Valley with seven cooperating institutions, declares that the excavations "promise startling results."

Science News Letter, July 6, 1946



DERMATOLOGY

Reflected Rays Can Cause Sunburn and Freckles

➤ **PEOPLE SITTING** in the shade can get a sunburn if near the water. Water reflects the invisible, unfelt ultraviolet rays of the sun. A person lying in the noonday sun can get more sunburn than if standing or walking because the rays fall directly on his body. Sun should be taken in small doses, not more than ten minutes at first, the Indiana State Medical Association points out.

Science News Letter, July 6, 1946

GEOPHYSICS

Electric Charges in Snow Affect Flying

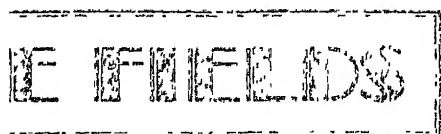
➤ **ALL SNOW** particles carry electric charges, but there is a considerable difference in the amount of electricity carried by different-sized snowflakes. Lowest charges are carried by the small, smooth-edged, dry snow crystals that fall from lofty cirrus clouds during or just before severely cold weather. Highest charges are carried by large, lacy, wet snowflakes, often matted together, that fall when the mercury is just a few degrees below freezing-point.

These and other facts about electric charges on snow particles were presented before the meeting of the American Geophysical Union by Dr. Vincent G. Schaefer, research physicist with the General Electric Company.

Study of snowflake electricity is no mere pastime or hobby; although the electric charge on an individual snow crystal is very minute, an airplane flying through a snow-cloud brushes against myriads of them and the aggregate charges become really troublesome static.

Plane flights through snowstorms were used in part of Dr. Schaefer's study. Snow crystals are too perishable to keep after capture, so he used a method for getting permanent prints of their shapes which he originated several years ago. It consists simply in letting the crystals fall on a plastic solution having the consistency of syrup or glue. The plastic subsequently hardens, preserving the outline of the vanished crystal as long as desired.

Science News Letter, July 6, 1946



ELECTRICITY

Giant Lightning Arrester Now Being Constructed

➤ CAPABLE of taming the most powerful thunderbolts is a 40-foot-tall lightning arrester, the largest ever built. An experimental model is nearing completion in the Laboratory of the Westinghouse Electric Corporation. With two others of different design, it will be installed on the new 500,000 volt test transmission line being built by the American Gas & Electric Company near Steubenville, Ohio, and will help engineers to find information on the best type of protection for such lines. This sentinel will run harmlessly to the ground heavy power surges that travel along the wires after a lightning hit, thus assuring uninterrupted service to factories and homes.

Science News Letter, July 6, 1946

AERONAUTICS

Navy's Nylon Vest Will Save Air Crash Victims

➤ NYLON airplane crash harnesses that can absorb more than 10,000 pounds of impact may save the lives of future air crash victims as experiments continue at the Naval Medical Research Institute on a new safety vest.

Called a "deceleration harness," the new device is made of undrawn nylon that stretches but has no elastic recoil. Ordinary safety belts now used in military and passenger planes were found to break beyond 3,100 pounds of pressure, while making the belt stronger would send the force of impact from the belt to the abdomen of the person wearing it with the prospect of serious injury.

The lightweight, nylon vest covers 156 square inches of the upper part of the body, spreading the strain, and there is no recoil impact because of the nonelastic quality of the undrawn nylon.

Terming the harness "still in the experimental stage," Navy officials declare tests have demonstrated the practical value of the new type of safety vest, but more work on design and development are needed.

More than 2,000 tests on conventional safety belts and the new harness have been made using the impact decelerator, a 14-foot platform with a weight suspension rig and recording instruments.

To test the harness with the impact decelerator, the subject lies on his back on the platform wearing the vest, while a 500-pound weight is attached to a slide on a steel rod leading down from the back of the harness. The equivalent of 10,000 pounds of impact is transmitted to the harness when the weight falls five feet.

Work on the crash harness is under the direction of Comdr. Howard R. Bierman, U. S. N. R., with 30 officers and enlisted men participating in the tests on a volunteer basis.

The harness, which is shaped like a fencer's vest, is made of three-ply, undrawn nylon, developed and treated by All-American Aviation, Inc., Wilmington, Del. Tests show that up to 3,300 pounds of pressure the new harness reacts much like a safety belt, but as the stress increases, the stretch of the nylon absorbs more shock.

Many airplane pilots and passengers in crashes are killed by being thrown against the cabin walls and ceilings and other obstacles, and the new harness is expected to prove equally valuable to military and commercial flying.

Science News Letter, July 6, 1946

CHEMISTRY

Vacuum Methods of Dehydrating Foodstuffs

➤ VACUUM dehydrated fruits and vegetables, which scientists claim are superior dried foods that people will really like, have recently been patented. Seven separate patents were granted Robert M. Schaffner of Chicago for vacuum methods of dehydrating foodstuffs.

In dehydrating green peas, for example, the peas are blanched promptly after picking, then cooled and held so until put in the vacuum chamber. The drying in the chamber is done at low pressure in an atmosphere of superheated steam with the contents exposed to radiant heat giving a temperature of 228 to 338 degrees Fahrenheit. The moisture content of the peas is reduced to about 10%.

Other methods patented are for green beans, navy beans, soybeans, corn, beets, carrots and pork. The patents have been assigned to Guardite Corporation.

Science News Letter, July 6, 1946

MEDICINE

Anti-Blood Clotting Drug Helps Sclerosis Patients

➤ AN ANTI-BLOOD clotting drug, first discovered in spoiled sweet clover, is helping patients with multiple sclerosis, Dr. Tracy J. Putnam of New York and associates, Drs. Ludwig V. Chiavacci, Hans Hoff and Hyman G. Weitzen, reported at the meeting of the American Neurological Association in San Francisco.

The disease is one in which hardened, thickened spots occur throughout the brain or spinal cord or both. Weakness, incoordination, strong jerking movements of legs and arms, abnormal mental exaltation, speech difficulty and nystagmus are among the symptoms. The disease is incurable.

Taking the view that the hardened patches result from blood clots in the veins, Dr. Putnam and associates tried the anti-blood-clotting chemical, dicoumarin.

Symptoms already present are not changed, but 23 of 26 patients who had been having attacks off and on were free from new attacks while taking the drug. In one case, a relapse occurred when the patient became refractory to the drug. In three others, the drug was temporarily stopped. Acute relapses occurred at once in two.

Symptoms have slowly progressed in 10 out of 16 patients with a chronic, progressive form of the disease, but none has shown acute new symptoms.

Science News Letter, July 6, 1946

CHEMISTRY

Shrinkproof Rayon Can Be Produced

➤ RAYON THAT will not shrink has been developed using a new chemical treatment in making the fabric, Dr. R. L. Bateman, manager of the fine chemicals division, Carbide and Carbon Chemicals Corporation of New York, told the Kalamazoo section of the American Chemical Society.

Predicting a vast expansion of the rayon market, Dr. Bateman reported that spun rayon can now be made shrinkproof by using a chemical new to industrial applications, glyoxal. Controlling rayon shrinkage by chemical means will lead to greater use of rayon clothing fabric, he explained.

Science News Letter, July 6, 1946

CHEMISTRY-ENGINEERING

Plastics Invade Printing

Lightweight synthetic resins replace usual type metals for making printing plates. Used for rushing duplicate advertisements to printers.

By MARTHA G. MORROW

► THE PLASTICS age has invaded the printing industry. Illustrations and type such as are used by this magazine can be printed from plates of synthetic resin instead of conventional type metal.

One of the war developments of our overseas propaganda warfare was the use of feather-weight plastic halftone plates to carry pictures to such out-of-the-way places as Arabia and China.

Plates of resin also proved useful closer to home. The Government Printing Office, Uncle Sam's immense factory of printing, employed them to speed delivery of stories and illustrations to South America for use in local newspapers.

They are now being used at a number of centers throughout the country in printing notices about housing for veterans, blanks for change of address, and life insurance applications. Duplicate advertisements, to be inserted in home-town newspapers, are rushed to printers in the form of plastic plates that can be incorporated directly in the type forms from which the newspaper mats are made.

Metal plates are then cast from the mats and sent to press.

Light in Weight

Duplicate printing plates of plastic, which weigh only about one-eighth as much as similar plates of metal, came into prominence during the war both because they eliminate the use of metal, a critical material, and because they are light in weight for shipping or storing. Carefully selected and directed publicity material ready for printing was furnished Latin-American countries in order to create good will through better understanding of our country and allied nations. The plastic surface is so durable that there is little chance of their being damaged in shipment or in storage.

Originals Always Metal

The original plate is not of plastic but of metal. Plastics are used in making duplicate printing plates from both halftone and linecut metal originals, in addition to molding plates from type forms and electrotpe patterns. The originals may themselves be used in printing di-

rectly on paper, and the idea is to make a plastic printing plate that will be an exact duplicate.

There are two steps in making duplicate printing plates. First, it is necessary to make a matrix or reverse plate from the original photo-engraving, zinc etching or type form. Then a printing plate is molded in resin from this matrix.

The original pattern, such as a type form or printing plate, is placed in a molding press and covered with a sheet of plastic. Bakelite, a thermosetting plastic, is most frequently used. This differs from thermoplastic material in that it does not lose its shape when reheated.

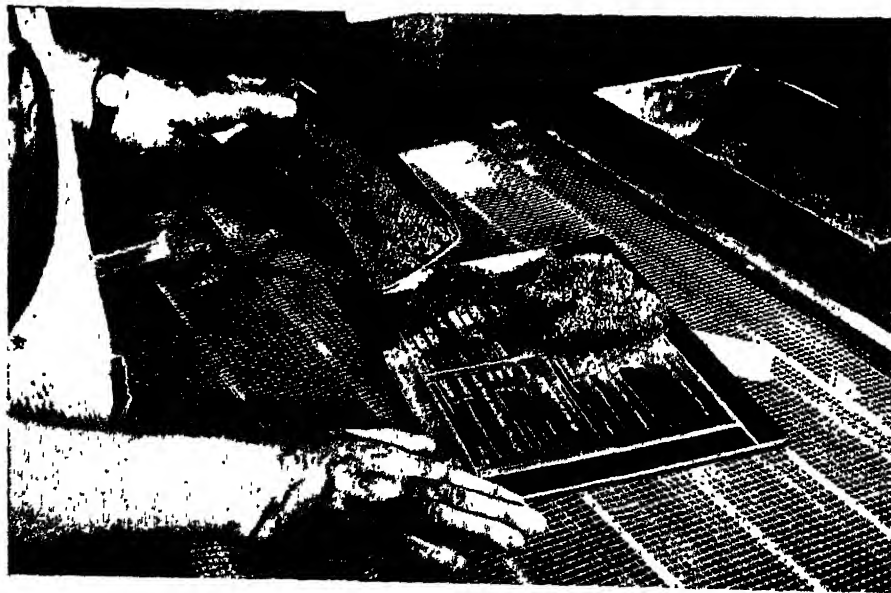
The molding press lightly squeezes the plastic sheet and the metal pattern together. After a few seconds the resin softens sufficiently to permit the form of the metal pattern to be pressed into it. To do this, the pressure on the plastic is increased slightly. The press is held closed for ten minutes, during which time the resin polymerizes or "sets," fixing a sharp, reverse impression of the original pattern in the smooth, hard plastic surface. The matrix has by then become permanently hard and is ready for use.

Granulated Plastic

The plastic from which the printing plate itself is made comes in the form of a granular powder. First the matrix face is coated with a special lubricant, then the powdered plastic is spread on it. The thermoplastic vinylite is usually employed. The matrix and powder are together placed in the forming press.

The press is closed to firm contact and held in position for three minutes while being heated to 260 degrees Fahrenheit. About 1,200 pounds per square inch of pressure is applied. The heat softens the powder and the pressure squeezes it into a solid form similar to a soft rubber sheet which flows into the cavities of the matrix. In this way the plate is made to assume the form of the original metal printing plate or type form.

The thickness of the finished plate is governed by thickness bearers placed between the metal platens of the press. When the printing plate is formed, the press is opened immediately and the entire assembly transferred to a chilling



PLASTIC GRANULES—These are spread on the matrix before it is inserted into the press, where it is heated and squeezed to take the form of the original printing plate.



PROOF—After the matrix is cooled and the resin has "set," proofs are pulled to be sure the plate gives an exact duplicate of the original metal printing form.

press where cool water absorbs the heat from the plate, hardening it.

The printing plate is stripped from the matrix and the rough edges sliced off. The plate is then trimmed to the desired thickness, around 0.152 of an inch, by shaving off excess material from the back. All excess plastic is next routed out from non-printing surfaces on the plate side, chips removed and rough edges smoothed off. Then a proof is pulled to be sure the plate is ready for use.

A number of duplicate printing plates of plastic can be made from one master plate. This method of making duplicate plates is faster as well as cheaper than conventional methods. From original pattern to plastic duplicate, only about 45 minutes is needed to make a plate ready to be printed. As many as 250,000 sheets can be printed from one type or line plate without showing signs of fuzziness or other imperfections in the letters.

Plastics have been used experimentally for printing for several decades. It was during the war, however, that they proved their value for making duplicate copies. The Government Printing Office pioneered in research on the use of plastics in making duplicate plates.

Experiments are also being conducted to perfect printing type in plastic that will wear as well and produce as sharp an outline as the metal type in use today.

This is still in the experimental stage, however.

Book Bindings in Color

Today plastic book bindings are popular for catalogues, calendars, check books, notebooks and pamphlets. First used in this country about a decade ago, a variety of types are employed at present. Some are spiral in shape, some comb-like with the teeth curled, while others lock into place. These bindings enable every page to swing freely and lie flat. Colored plastic bindings, lighter in weight than the metal they replace, are colorfast and durable.

Many of us have probably often seen boxes of candy beautified with transparent sheeting and fruit protected with it, or vegetables and meats wrapped in it, without stopping to think that it is made of plastic. Cellophane is made from the same viscose used in manufacturing rayon.

Special Inks Needed

When cellophane was first introduced as a protective wrapper for foods, it presented an entirely new set of problems to the printing industry. Paper absorbs ink rapidly; cellophane does not. Because of this difference, none of the inks then in use could be employed, and none of the usual methods of printing on paper were satisfactory. Inks did not dry

properly upon cellophane. They were too transparent to show up well on the transparent paper. They invariably ran or smeared.

To overcome these difficulties, new inks were made and tested in the hope of developing those that would give greater depth of color, faster drying time, and, above all, better anchorage to the slick surface. Some inks in use today dry themselves with a speed unknown a few years ago. Others are dried rapidly by passing the printed cellophane over heated rolls or hot air.

The use of plastics in printing today is of particular interest as the plastics industry owes its origin to a printer. About 75 years ago there was a scarcity of elephant ivory for billiard balls and a cash prize of \$10,000 was offered for a substitute. A young American printer, John Wesley Hyatt, won the award by mixing cellulose nitrate, formed by the action of nitric acid on cotton cellulose, with camphor and treating them with heat and pressure. Thus was created celluloid, the world's first plastic.

If you would like to have samples of Plastic Printing Plate, Plastic Sheeting and Plastic Book Binding, you can secure the Plastics in Printing Unit of THINGS of science, a kit prepared by Science Service, by sending 50 cents to SCIENCE NEWS LETTER, 1719 N. St. N. W., Washington 6, D. C., and asking for THINGS Unit No. 68.

Science News Letter, July 6, 1946

MEDICINE

Seaweed Chemical Stops Bleeding in Surgery

► SOON TO BE added to other aids for stopping bleeding during surgical operations is a gauze-like material from seaweed developed under the direction of Dr. James J. Eberl and Dr. John Henderson of the Johnson and Johnson Research Laboratories.

To be sold under the name of Hemo-Pak, the new material can be sterilized just as ordinary surgical dressings are and can be safely left in the wound when that is sewed up. Ultimately it is absorbed and carried away by body fluids.

The material owes its ability to stop bleeding to alginic acid extracted from seaweed. The anti-hemorrhage action of this seaweed chemical in powdered form has long been known. Converting it into the gauze-like material the surgeon can use readily was achieved through several years of intensive research.

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Do You Know?

World records of lifting heavy loads to great heights by airplanes have been recently broken by B-29 Army planes; one lifted a 2,200-pound load to 45,000 feet altitude and another 11,000 pounds to 42,780 feet.

Beechwood pulp is the source of 90% of Germany's rayon production; it is preferred in that country to birch or poplar because of its low methanol-benzene extract.

All centipedes feed upon insects and other small animals, and all inject a poison into their victims as they bite which anesthetizes the prey so that it can be eaten at leisure.

The United States, the United Kingdom, France, Germany and Japan were the principal users of natural rubber in prewar days.

Silica sand in the Florida belt from Miami to West Palm Beach is thought by some experts to be suitable for the manufacture of high-grade glass.

Eggplants are suggested for meatless days; they have high nutritive value.

More than half the cotton grown in the United States is sold abroad.

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By O. L. Levin, M. D. and H. T. Bohman, M. D.

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ENTOMOLOGY

Dragonflies Food for Ducks, But Kill Bees

➤ DRAGONFLIES, frequently located around ponds and lakes by their shimmering wings, are among the most important lesser carnivorous animals. They are well known to fishermen who use them in the immature stage for bait.

Many species of fish eat dragonflies in their nymphal or immature stage. These nymphs, found sprawling on the bottoms of ponds or climbing among aquatic plants, often constitute as much as one-half or three-quarters of the food consumed by such fish as bass and freshwater trout, states Dr. Mike Wright of Tusculum College, Greeneville, Tenn.

Fish that eat adult dragonflies can catch them only when they are depositing eggs. Species of dragonflies that back down beneath the surface of the water to deposit their eggs in plant tissues stand a greater chance of being seized than those that broadcast their eggs while in flight by dipping the tip of the abdomen into the water, Dr. Wright reports.

Dragonflies in the immature stage form an important part of the diet of ducks, particularly the diving species that forage in marshy or aquatic areas where dragonfly nymphs are present. They compose almost a quarter of the total food consumed by young ring-necked ducks.

Flies, mosquitoes and gnats are eaten by practically all species of dragonflies, especially when the pests occur in large numbers. Yet it seems that although large numbers of the insect pests are destroyed by dragonflies, little or no actual control is effected by these predators.

But dragonflies aren't always man's friend. They are particularly notorious bee-killers, for example. Two species in the South have been found to destroy both queen and worker bees. In regions where there are a large number of dragonflies, the damage is sometimes so great as actually to keep queens and package bees from being produced for market.

Whereas large fish feed on the nymphs, the larger nymphs in turn cause considerable destruction among the smaller fish, particularly in hatchery ponds. Sometimes half or more of the fish are lost in this way.

Dragonfly nymphs and adults serve as intermediate hosts for a large number of flukes, spreading these parasitic worms where they can do much harm among poultry, frogs and other animals.

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SURGERY

Removing Tuberculous Lung is Successful

➤ SUCCESS IN treating tuberculosis by surgical removal of an entire lung was reported by Dr. Richard H. Overholt, of Brookline, Mass., at the meeting of the National Tuberculosis Association in Buffalo, N. Y.

In a group of 88 patients operated on between 1934 and 1944, 76 survived the operation. Of these 80% are living and 67% are "clinically well," he reported.

The operation of removing a lung is becoming a progressively safer form of treatment due to improved technic which reduces serious complications. It is still too soon, Dr. Overholt stressed, to draw final conclusions as to its value.

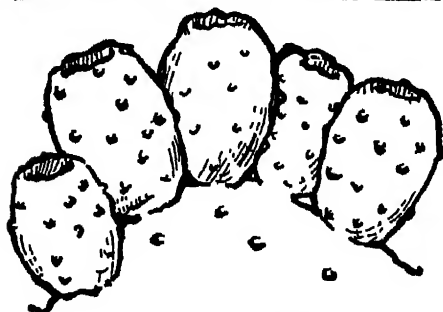
The risk in removing an entire tuberculous lung is now about 10% and of a lobe of a lung less than 5%. The operation, Dr. Overholt emphasized, should be used to supplement, not to compete with, other established methods of treatment. It is not a substitute for thoracoplasty, by which parts of the ribs are removed to collapse the tuberculous lung.

The patients Dr. Overholt reported had all been treated unsuccessfully by other methods or had such extensive disease that collapse of the lung would obviously not help them.

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FOOD FOR DUCKS—Dragonfly resting on a cattail. Picture by George A. Smith, Quarryville, Pa.



Fruit of the Desert

► THE FRUIT of the prickly-pear cactus is almost literally a contradiction of the proverbial impossibility of gathering figs from thistles. Even on Eastern markets, prickly-pear fruit is often offered in little boxes or baskets, like fresh figs. Its clientele is relatively small, but devoted.

Tourists in the Southwest, seeing clumps of prickly-pear cactus with clusters of ripe fruit, are often tempted to gather a few for themselves. If inexperienced, they had best beware: there are no long spines on the fruit as there are on the flat joints of the plant, but in the seemingly innocuous little spots that sprinkle their surfaces are something

much worse—bundles of tiny barbed prickles that get into the tongue and the cheek linings and make them sore for days afterwards. With sufficient skill, it is possible to impale one of these "pears" on a sharp stick and peel it with a pocket-knife—but the penalty for overlooking even one of these prickly-clusters is severe.

The un-prickled prickly pears that you find on the market are harvested from cultivated cacti, most of them probably descended from the spineless cactus introduced by Luther Burbank a generation or so ago. Nearly spineless cacti are often found growing wild, but Burbank apparently took one or more of these natural variants and by selection for freedom from spines succeeded in improving on the original forms. His spineless cactus did not prove the boon to the Western stock-raising industry that he hoped, but as a source of a pleasantly tart fruit novelty it has done very well. There are some who carp at the number of angular seeds in a cactus "pear"; but if you have patience enough to eat a pomegranate you will appreciate cactus fruit.

For unknown generations, cactus fruits have been a regular part of the diet of some Southwestern Indian groups. They, however, do not confine themselves to the use of prickly-pear; in fact, their principal source is the giant sahuaro or tree cactus, which, of course, yields bigger harvests.

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Dr. Rhoads states. In one kind of cancer of the lung, limited experience with one of the nitrogen mustards has been favorable enough to encourage further trials

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From Page 4

First, marine bacteria will form films on the steel plates; these films will give foothold to later comers. Soon the decks, upper works, masts, funnels, everything will carry a mixed population of barnacles, sponges, sea anemones, mollusks and other "rooted" animals. Brilliant fishes will swim in and out of the observation towers and the ack-ack positions. Crabs will sidle across the sloping decks, octopuses will lurk in the gun-ports.

But this will not be forever. The coral will come. Coral is not the first thing to grow on newly available sites in the warm seas, but it is almost always the last. It will appear among the myriad other animal forms, gradually spreading and growing higher and thicker, until the entire wreck is encrusted. Nothing about the sunken ships "but undergoes a slow sea-change into something rich and strange."

After centuries, nothing will be discoverable about the once proud vessels of war but masses of coral. Oceanographers of that day may wonder a little over their somewhat atypical shape.

Science News Letter, July 6, 1946

MEDICINE

Gas Aids Cancer Study

► ONE OF THE nitrogen mustard war gases now under trial as a possible remedy for some kinds of cancer and cancer-like diseases will be distributed free to qualified institutions for scientific investigations through the committee on growth of the National Research Council, Dr. Cornelius P. Rhoads, chairman, announces in a report. (*Journal, American Medical Association*, June 22).

So far, 160 patients suffering from cancer and cancer-like diseases have been treated with one or the other of two nitrogen mustards, Dr. Rhoads reports. The compounds have been studied at Yale, the University of Chicago, the University of Utah and Memorial Hospital in New York City with the cooperation of the Chemical Warfare Service.

The nitrogen mustards are not a cure for such cancerous diseases as have been

studied, Dr. Rhoads states.

They are injurious to many kinds of body tissue when given in large enough doses. Chief poisonous effect is on blood formation.

Tumors or cancers grow smaller when these chemicals are used in treatment but the change is temporary and rarely lasts more than several months. Patients with Hodgkin's disease improve but relapse within two weeks to a few months. Further treatment may again bring improvement but for a shorter period.

Results in leukemia are disappointing, it appears. In one kind of lymphosarcoma the nitrogen mustards seem to help but so does radiation treatment.

In any active, extensive cancerous condition which has not been controlled by other treatment, experimental use of the nitrogen mustards is probably justified,



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CHEMISTRY

New Materials in Paints

► PAINTS ARE NOT what they used to be. They are better, thanks to chemists and technical men who have found new constituents for them and better methods of preparation, Dr. J. J. Mattiello, of the Hilo Varnish Corporation, told the American Society for Testing Materials in the annual Marburg lecture.

Dehydrated castor oil is used as a substitute for imported tung oil, chemically treated natural oils are included as drying oils, and titanium dioxide, as a pigment, is replacing lead in part. Other new materials have come into use in the past decade.

In outside house paint, the pigmentation trend seems well established toward lower lead and increased titanium dioxide, and the trend will continue.

The formulation of outside house paint, Dr. Mattiello said, over the past 20 years has seen many changes in the composition of the pigment, but the vehicle has remained practically unchanged, being about 90% binder and 10% thin-

ners and driers.

The earliest historical use of coatings was for decoration. Other uses are protection of structural and technical materials, and to obtain better distribution of light or greater illumination of objects.

Shortages during the war of long-used materials, and the need for protective coatings for war equipment under every sort of climatic condition, forced manufacturers to use different materials and to develop new coatings.

Drying oils, he stated, presented a particular problem. Tung oil, the king of driers, was available only in small quantities. One solution was the development of additives that speeded up the bodying of domestic and other natural oils, making them usable.

Dehydrated castor oil was the first chemically treated oil extensively used as a replacement for tung oil. By dehydration, the castor oil is chemically converted into a drying oil.

Science News Letter, July 6, 1946



CHAINED—This punch press operator is happy to be chained to his machine at SKF Industries, Inc. This safety device synchronizes movements of the operator's hands with those of the machine, and snatches his hands out of the way if he fails to move fast enough.

MEDICINE

Re-Educate Appetite To Lose Weight

► DON'T COUNT your calories but re-educate your appetite.

This advice to fat people who want to lose weight will surprise many, but it gives good results as shown by records of patients who lost up to 100 pounds, reported by Dr. M. M. Kunde, of Northwestern University Medical School and the Out-patient Endocrine Clinic of Cook County Hospital, at the meeting of the Association for the Study of Internal Secretions.

The patients he reported had all previously been told by physicians that their excess weight was due to glandular disorder and some of them did show evidence of specific sex gland, thyroid or other disorder.

They lost weight through treatment which did not include any glandular products or hormones. Nor were the advice and services of dietitians used.

"Weight reduction in these patients," Dr. Kunde stated, "was handled as any other major medical problem and patients reported directly to the physician.

The importance of mental and emotional factors in overweight was stressed

by Dr. S. Charles Freed, of San Francisco.

Overweight, he declared, is not a glandular disturbance except in rare cases. It results from the patient expending fewer calories in energy than he takes in his food. The inability to control the intake of food to the level which keeps weight from increasing is due to underlying psychic drives.

Many psychic factors increase the urge to eat and the inability to control this urge. Other factors including organic disease and glandular disorder may be involved. They all, however, have one thing in common, that they increase the person's psychic or nervous tension.

Treatment found effective by Dr. Freed consists in "inducing a sense of well-being in the patient" by correcting any organic, glandular or psychic disorder. In addition benzedrine sulphate, popularly known as "pep pills," is used to curb appetite and establish "a high morale so that the patient is encouraged to continue depriving himself of the pleasure of eating."

Science News Letter, July 6, 1946

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Books of the Week

ALCOHOLISM IS A SICKNESS—Herbert Yahraes—*Public Affairs Committee*, 32 p., illus., paper, 10 cents Up-to-date, scientific facts about alcoholism the disease, recommending rational and humane steps the public needs to take on this social problem.

ATOMIC ENERGY IN COSMIC AND HUMAN LIFE Fifty Years of Radioactivity—George Gamow—*Macmillan*, 161 p., illus. \$3 A picture of the problem of atomic energy, answering the question What is it? Where did it come from? And how can it be used for better or worse?

A COLLEGE PROGRAM IN ACTION A Review of Working Principles at Columbia College—*Columbia Univ. Press*, 175 p., \$2 A record of the experience of 25 years of general education in Columbia College, describing how such a program has been carried out and how it has developed and changed

THE GULF STREAM—Ruth Brindze—*Vanguard*, 63 p., illus., \$2.50 A story for children of the river which flows through the ocean Attractive and instructive illustrations by Helene Carter.

HANDBOOK OF SOUTH AMERICAN INDIANS Vol 1, The Marginal Tribes—Julian H. Steward, Ed.—*Government Printing Office*, 624 p., maps and illus., \$2.75 The archeology and ethnology of the primitive hunting and gathering tribes of eastern Brazil, the Gran Chaco, the Pampas, Patagonia, Southern Chile, and Tierra del Fuego Smithsonian Institution, Bureau of American Ethnology, Bull. 143.

HANDBOOK OF SOUTH AMERICAN INDIANS, Vol 2, The Andean Civilizations—Julian H. Steward, Ed.—*Government Printing Office*, 1035 p., maps, tables, and illus., \$4.25 The high-culture, farming peoples of the Andean Highlands and the Pacific Coast from Columbia to Central Chile Smithsonian Institution, Bureau of American Ethnology, Bull. 143.

INTRODUCTION TO ATOMIC PHYSICS—Henry Semat—*Rinehart*, 412 p., tables and illus., \$4.50, rev. ed. A textbook for a one semester's course in which the students have had one year of general college physics and a course in calculus. This revised edition contains new information on the betatron, the nucleus, etc.

THE LAND RENEWED: The Story of Soil Conservation—William R. Van Dersal and Edward H. Graham—*Oxford Univ. Press*, 109 p., illus., \$2. A vivid story of how our land can be saved for ourselves and for future generations

LORAN HANDBOOK For Shipboard Operators (Ships 278)—*Government Printing Office*, 68 p., diagrs. and illus., paper, 30 cents.

MODERN ORGANIC FINISHES, Their Application to Industrial Products—Rollin H. Wampler—*Chemical Publishing Co.*, 452 p., illus., \$8.50. A presentation of practical commercial methods of preparing surfaces for finishing, applying organic protective and decorative finishes, and drying these finishes.

THE MOSQUITOES OF THE SOUTHERN

UNITED STATES EAST OF OKLAHOMA AND TEXAS—Stanley J. Carpenter, Woodrow W. Middlekauff, Roy W. Chamberlain—*Notre Dame Univ. Press*, 292 p., illus., \$4.00 Specific descriptions and illustrations showing diagnostic features of adult females, male terminalia, and larvae, distribution records for each species and data about medical importance and bio-nomics

PAPER BULLETS A Brief Story of Psychological Warfare in World War II—Leo J. Margolin—*Froben Press*, 149 p., illus., \$2.50. An outline of both Allied and enemy propaganda in this war

PEOPLE IN QUANDARIES The Semantics of Personal Adjustment—Wendell Johnson—*Harper*, 532 p., \$3. A book about the problems people encounter in living in a world where there are other people and a discussion of these problems and of ways of dealing with them in terms of general semantics—a point of view which emphasizes those aspects of scientific method which are useful in daily living

REVIEW OF THE NEW WORLD SPECIES OF HIPPODAMIA DEJEAN (COLEOPTERA COCCINELLIDAE)—Edward A. Chapin—*Smithsonian Institution*, 62 p., illus., paper, 35 cents. Smithsonian Miscellaneous Collections, Vol 106, No 11.

SCIENCE FOR DEMOCRACY—Jerome Nathanson, Ed.—*King's Crown Press*, 170 p., \$2.50. Essays and discussions by scientists on the general topics Science in the National Economy, The Challenge of Science to Social Thinking, Does Private Industry Threaten Freedom? The Role of Science

in the Determination of Democratic Policy

SMALL BOATS FOR SMALL BUDGETS—Jerrold Oakley—*Cornell Maritime Press*, 146 p., diagrs. and illus., \$2.50 Advice on how to buy a good boat and how to take care of it, written for those with \$50 to \$1,000 to spend.

VOCATIONAL EDUCATION IN THE YEARS AHEAD A Report of a Committee to Study Postwar Problems in Vocational Education—*Government Printing Office*, 329 p., tables and illus., paper 50 cents. A survey of the fields of agricultural, business, homemaking, trade and industrial education, and public service training, and data on occupational information and guidance

VOLCANOES New and Old—Satis N. Coleman—*John Day*, 222 p., illus., \$3.75. A book written to satisfy a growing interest in volcanoes, written not for the scientist, but for the general reader, and discussing the causes of volcanic activity, volcanic materials, varieties of volcanoes, and their geographical distribution

Science News Letter, July 6, 1946

The chemical *weed killer*, 2,4-D, is hardest on broad-leaved plants and easiest on grasses; it will kill dandelion and plantain in the lawn, and may attack clover.

Malaria is an 18th century Italian word meaning "bad air."

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• New Machines And Gadgets •

✿ **RADAR UNIT**, for school or home demonstration, resembles a large flashlight, weighs four pounds, and operates on ordinary house current. It converts the current into five-inch electromagnetic waves which can be focused into a beam, and reflected from metal objects as radar waves are reflected from a ship or plane.

Science News Letter, July 6, 1946

✿ **CEMENTED** carbide "lead" replaces the ordinary lead in any automatic pencil to make a tool for writing on metal, glass or other hard surfaces. Though it looks like pencil lead, it will not write on paper. A silicon carbide stone is used to sharpen this tiny rod of the hardest metal known.

Science News Letter, July 6, 1946



junes the contents or the postmark. It is a simple device, as the picture shows, operated with an easy pull on a lever. With it, 30 to 40 letters can be opened in a minute.

Science News Letter, July 6, 1946

✿ **NON-DRIP** faucets for household and other uses turn off easily because the shut-off of the valve mechanism operates in the same direction as the water flow, thus water pressure aids in closing the valve. If left open enough to drip, the water pressure closes the faucet completely.

Science News Letter, July 6, 1946

✿ **FISHING DEVICE**, to help keep a hooked game fish from pulling away, is a small parachute-like attachment inserted into the fish-line; it opens when

the fish is running away and makes a drag. When the fisherman pulls harder than the fish, the chute closes.

Science News Letter, July 6, 1946

✿ **COLD CATHODE** fluorescent lighting fixture for commercial use is instant starting and carries either two or four lamps, nearly eight feet long, whose operating life is claimed to be normally 10,000 hours. Safety features prevent possibility of shock when changing lamps.

Science News Letter, July 6, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 318.

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Question Box

AERONAUTICS

What new device will save air crash victims? p. 9.

What new army bomber is larger than the B-29? p. 8.

ALLERGY

What caused the first case of skin allergy found on a horse? p. 5.

BIOCHEMISTRY

How does the chemical composition of the body change during prolonged fasting periods? p. 5.

CHEMISTRY

Name some of the new products scientists predict will come from fluorine. p. 2.

ECOLOGICAL-ATOMIC ENERGY

What insecticide has preceded the atomic bomb at Bikini and may have some effect on the record made by the bomb? p. 8.

In what way will cancer research benefit from the atomic explosion? p. 3.

Where published sources are used they are cited.

ENGINEERING

How can doomed oil wells be made to produce again? p. 6.

How can concrete floors be made resilient and easy on the feet? p. 5.

ENTOMOLOGY

What important service does the dragon fly give? p. 12.

MEDICINE

By what means can TB germs in the air be killed? p. 7.

What chemical may prove to be a remedy for athlete's foot as well as ringworm? p. 6.

What latest medical discovery helps sclerosis patients? p. 9.

What chemical has proved successful in treating two kinds of cancer? p. 2.

Which of the war gases aids in cancer research? p. 13.

NUTRITION

What new vitamin is essential to the body's needs as well as the diet? p. 7.

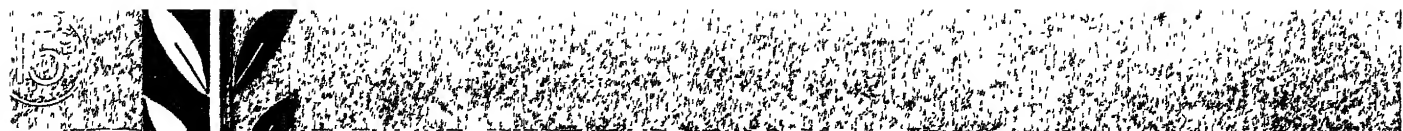
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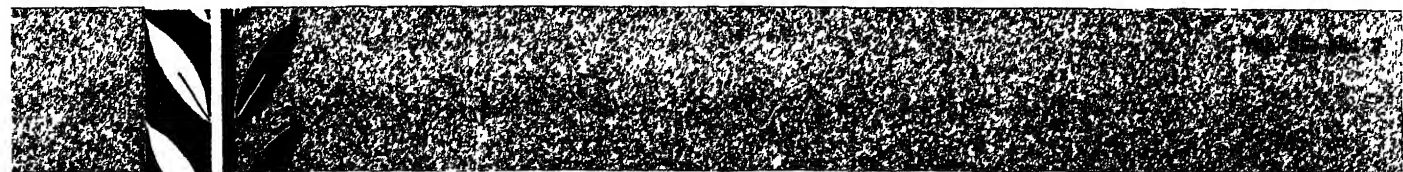
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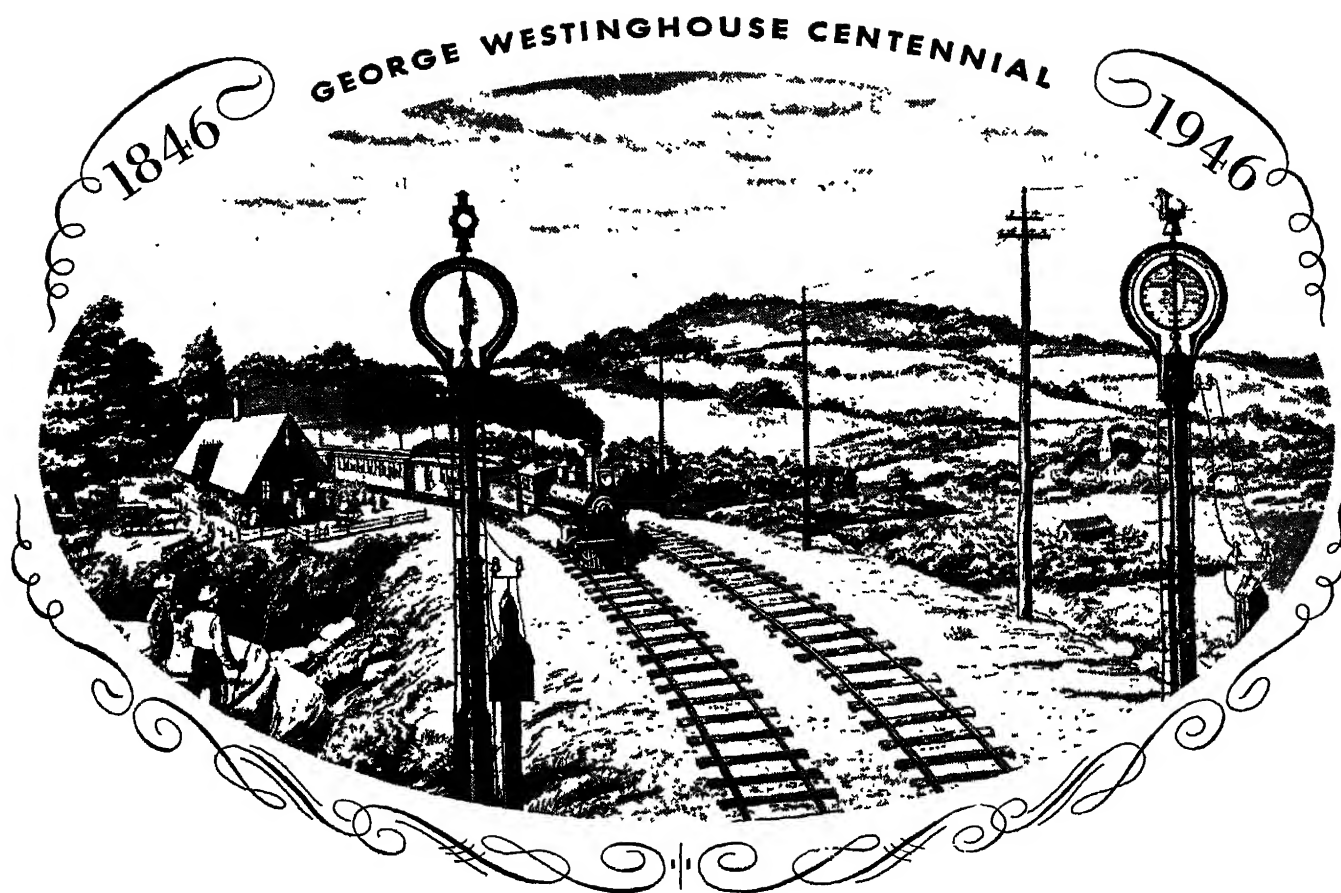
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Semaphores of Safety

Although world-famous as the inventor of the railway air brake, few people realize that George Westinghouse also pioneered the *first automatic block-signaling system* for railroads.

While developing the air brake, Westinghouse clearly foresaw the need for improved railway traffic controls—to meet the demand for *greater speed and safety* in our rapidly expanding transportation systems.

In those early days, switches and signals were moved by hand. But, in such manually controlled devices, too much depended on the human element.

A watchman might fall asleep—or become ill. Or some other mishap might break the human links in the chain and lead to disaster.

In 1881, George Westinghouse began to apply his brilliant inventive genius to the problem of power signaling and interlocking. As one scientist expressed it, “he used compressed air for the heavy work, electricity to pull the trigger.”

And the same basic principles of railway signaling, developed by Westinghouse more than half a century ago, *still serve in controlling our vast railroad networks of today!*



Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE

TODAY—The Westinghouse Electric Corporation is providing *semaphores of safety* in yet another field—marine transportation. Recently, Westinghouse engineers equipped an Old Bay Line steamship with a *radar navigational aid* . . . to guide it safely through fog and dark of night.

Now the S.S. “City of Richmond” makes its nightly run between Baltimore and Norfolk—*safely and free from delays* due to bad weather. Similar Westinghouse radar installations are now planned for use on inland waterway, coastal and ocean-going craft.

Time in: TED MALONE—Monday, Wednesday, Friday, 11:45 am, EDT, American Network

GENERAL SCIENCE

Senate Votes Foundation

S. 1850 authorizing National Science Foundation wins approval; social sciences eliminated; attempts to ban science scholarships and change patent provisions lose.

By WATSON DAVIS

➤ TWO DIVERGENT views of science and research were made clear in the three days of Senate debate which resulted in the passage on July 3 of the National Science Foundation bill.

One view is that science is for the people, who act through their government to support the creation and application of scientific knowledge. What is discovered is important to all and should be freely available to all.

The other view seems to consider science as a useful but very special mechanism that can be best left in the hands of large boards of scientists appointed for long terms and remote from democratic control. The people through their government should not be concerned with the application of science. Non-governmental organizations involved should be allowed to acquire monopolies through the patents resulting from government-supported research.

The bill, passed 48 to 18, embodies the science-for-the-people viewpoint. Except that social science research provisions were eliminated on the floor, S. 1850 is essentially as it emerged from many months of hearings which combined earlier science bill versions by Sen. Harley M. Kilgore, D, W Va., and Sen. Warren G. Magnuson, D., Wash., who both led the successful support for the bill.

The successful Senate bill was introduced by a bi-partisan group of eight senators, including Senators Kilgore and Magnuson. Others were: Sen. Edwin C. Johnson, D. Col., Sen. Claude Pepper, D., Fla., Sen. J. William Fulbright, D., Ark., Sen. Leverett Saltonstall, R., Mass., Sen. Elbert D. Thomas, D., Utah, and Sen. Homer Ferguson, R., Mich.

The fact that some senators voted against the bill in the final vote shows that some senators can afford to be against science even in an atomic-penicillin age. About a decade ago no senator desired to be in favor of cancer when all the then senators joined in introducing a cancer research bill that was thus passed when it was introduced.

The final vote on S. 1850 does not tell the vigorous fight to modify or replace the bill waged by Sen. H. Alexander Smith, R, N. J., Sen. H. F. Byrd, D., Va., Sen. David I. Walsh, D, Mass., Sen. Raymond E. Willis, R., Ind., Sen. Thomas C. Hart, R., Conn., and Sen. John L. McClellan, D., Ark.

The first attack of these senators came as a substitute for S. 1850 in its entirety. Instead of the normal governmental agency set-up, control would have been placed in a 60 member board of virtual permanence, since appointments were to be for 16 years. The substitute differed from S. 1850 in most of its other provisions, eliminating undergraduate scholarships, specific patent provisions, etc. This attempted substitute lost 39 to 24.

Board Control Defeated

The bill was then attacked by the Smith group with specific amendments. The attempt to place control of the foundation in the hands of a board of nine instead of an administrator with an advisory board lost by only one vote.

A 41 to 31 vote defeated an amend-

nent that substituted for specific patent provisions of S. 1850 a general statement providing for the protection of the public interest and the equities of the contracting individual or organization. Sen. Chapman Revercomb, R, W. Va., was most concerned over what he considered a threatened change in the patent system, although only inventions made with governmental foundation support were concerned.

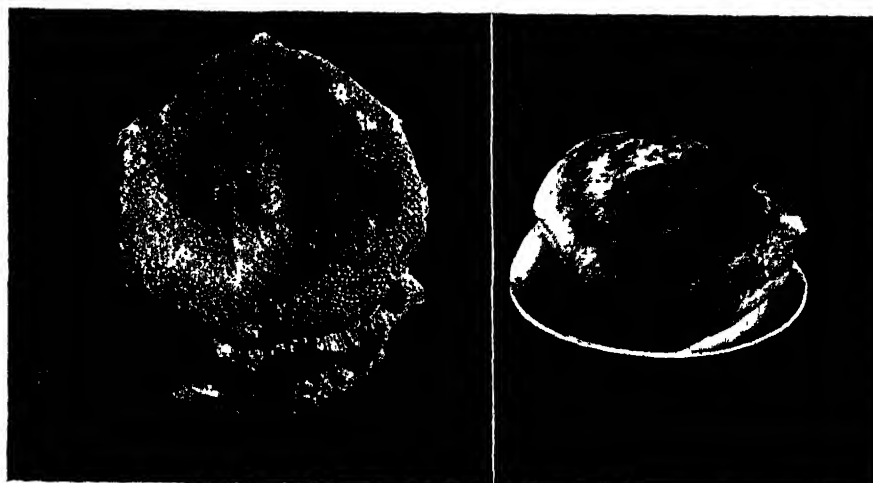
To prevent the giving of scholarships to science-talented high school graduates was the purpose of an amendment by Sen. Hart, defeated 42 to 27. Another amendment by Sen. Hart preventing the foundation from operating in the field of the social sciences won 46 to 26.

How soon the House can act on S. 1850 is problematical. Two days of hurried hearings have been held on a House science bill recently introduced that differs from the Senate bill and resembles one of the earlier Senate bills out of which S. 1850 was compounded. But the chances now seem to be good that a science foundation bill will be enacted by Congress this session.

Senate Vote on Science Bill

For the bill—48.

Democrats voting for—(37)—Andrews, Barkley, Carville, Chavez, Downey, George, Gossert, Guffey, Hayden, Hill, Hoey, Huffman, Johnson of Colo., Johnston of S. C., Kilgore, Lucas, Magnuson, Maybank, McCarran, McClellan, McMahon, Mead, Mitchell, Murdock, Murray, (Turn to Page 23)



FLOWERS AND FOOD—Sometimes geological specimens are not at all what they seem to be. The withered head of a sunflower on the left is really a hard rock fossil sponge, while the frankfurter in a bun on the right is actually a concretion. These unretouched photographs from the Cranbrook Institute of Science show what freakish forms rocks and minerals sometimes take.

MEDICINE

Life-Saving Methods Told

Many new medical discoveries reported to A.M.A.: Successful treatment for skin cancer, anti-blood clot chemical, and safer and more effective lung surgery.

By JANE STAFFORD

► EXTRACTS boiled out of human spleens and livers have been used successfully in treatment of certain kinds of skin cancers, Drs. Joseph C. Amersbach, Elsie M. Walter and George S. Spert, of the New York Post-Graduate Medical School and Hospital, Columbia University, and the Institutum Divi Thoinae, Cincinnati, reported at the meeting of the American Medical Association in San Francisco.

All of the cases treated were very small skin cancers and no work was done on internal cancers, the doctors pointed out.

None of the patients who have finished the treatment have shown any signs of reappearance of the cancer in a period of two to four years, but all will be carefully watched for a period of five years.

Altogether 46 patients were treated. The six most recent were treated with extracts of lamb liver. The cancer has entirely disappeared in one and the other five are still under treatment but have shown definite improvement, the doctors reported.

"Of the 17 treated with the human spleen extracts, two failed completely, two were surgically removed because the lesions (cancers) were very slow in disappearing, two failed to finish the treatments but the lesions were 50 to 90% improved when the patients were last seen, and in 11 cases the lesion completely disappeared," Dr. Amersbach said.

"In the 10 cases treated with extract of human liver, one lesion was surgically removed because it was too slow to disappear or regress, nine showed complete disappearance of the lesion, and three are still being treated."

The extracts were injected into and around the skin cancers once a week for from three to 30 injections.

The treatment reported resulted from much research by numerous investigators trying to induce resistance to cancer in laboratory animals and to find a method of treating cancer by some means other than surgery, X-rays or radium. The skin cancers treated were of a not very

serious type and were selected because if the treatment failed there would be no danger to the patient, since the more usual treatments could still be used.

Drug Prevents Blood Clots

► DICOUMARIN, the anti-blood clot chemical, is saving lives of those who otherwise would have died, Dr. Edgar V. Allen of the Mayo Clinic reported at the meeting. Among 1,686 patients undergoing surgical operations, approximately 73 who would have been expected to die are alive.

The lives saved were threatened by the clots which sometimes form in blood vessels, blocking the circulation, after operations, injury or disease. Many of these clots form in the veins of the legs. Many a woman knows about them from having suffered after childbirth the painful condition of thrombophlebitis. When these clots, technically termed emboli, are torn loose they may travel through the circulation and lodge in the smaller vessels of the heart or lungs, causing death.

Dicoumarin makes the blood clot less readily. It was discovered because of fatal hemorrhages in cattle that ate spoiled sweet clover.

Another anti-blood clotting chemical, heparin, is also being tried to prevent blood clots after operations. This chemical is obtained from animal lung tissue. Its chief disadvantage is its expense. Daily cost of treatment with heparin may run to \$9 while that for dicoumarin is only a few cents.

Both of these drugs have the disadvantage that hemorrhage may result from their use. They represent, Dr. Allen said, "only the first steps in the direction of securing satisfactory anticoagulants for clinical use."

Hemorrhage occurred in 3.1% and major hemorrhage in 1.9% of the 1,686 cases he reported.

Cure for Bronchiectasis

► CURES BY SURGERY of 42 out of 50 patients suffering with a chronic bronchial condition called bronchiectasis

also were reported by Drs. Ralph Adams and Bernard J. Ficarra of Boston at the meeting.

Real cure of this condition, they believe, can be effected only by cutting out the diseased lung tissue. They advise operating early in the course of the disease, not as a last resort, because through surgical cure the patients get "renewed competence to enjoy life and to assume its responsibilities."

They stressed the adverse effect the disease has on the patient's personality and ability to go to school or work.

Bronchiectasis is produced by a blocked or inadequate drainage of the bronchial tubes, plus some infection which weakens the muscular walls of the air sacs

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and tubes, causing them to lose their elasticity and to expand. They may increase to many times their normal size. Then mucus from the glands which line the tubes collects in the enlarged tubes and air sacs.

The condition often follows such infections as lung abscess, tuberculosis, chronic bronchial infections, obstruction in the bronchial tubes by mucus, polyps, tumors or foreign bodies such as peanuts which may be inhaled accidentally. Also it may follow measles, whooping cough or other childhood diseases.

"There can be little doubt," Drs. Adams and Ficarra said, "that a prolonged struggle against chronic disease may influence the character and career of any man. Patients with bronchiectasis often fall into this category. By the general public, these patients are branded as having tuberculosis. Oftentimes they have been studied in vain for tuberculosis.

"In the young, schooling is neglected because illness renders the child unable to keep pace with his classmates. With expressive but cruel wit, one child with a chronic cough was nicknamed. 'The Barker' and another with foul sputum as 'Stinky' by his fellows, and they henceforth attended school only under duress."

Childrens' Lives Saved

➤ A NEW life-saving operation for children born with a defect of the body's main artery was reported by Dr. Robert E. Gross of the Children's Hospital, Boston.

The defect is in the aorta through which blood from the heart starts on its course to all parts of the body. Some babies are born with the aorta narrowed or completely closed a short distance from the heart.

Dr. Gross saves the children by cutting out the narrowed or closed part of the aorta and sewing the cut ends together. The first patient was operated on just a year ago, after studies on animals showed the operation would succeed. Nine others have since had the operation. Of the ten, two died, but these deaths showed how others can be avoided and the operation made safe in the future.

These two deaths showed how others can be avoided and the operation made safe in future. One of the lessons learned was that the operation should not be done on patients over 15 years old, be-

cause the high blood pressure by that time will have made the walls of the aorta so hard and thick that its cut ends cannot be satisfactorily sewed together. The other lesson is that the clamps on the aorta to stop bleeding during the operation must be released very slowly.

Feeble-mindedness Checked

➤ AN OPERATION that rescues babies from the fate of being feeble-minded all their lives was reported by Dr. Franc D. Ingraham and Dr. Donald D. Matson of the Children's Hospital, Boston, Mass.

The operation consists of removing blood clots that formed on the baby's brain. Cause of the clots is injury, either during birth or, in some cases, after birth. A very young baby who bumps his head hard against the end or side of his crib may get such an injury.

In the early stages, the clots are fluid and can be sucked out by a needle inserted through small holes drilled through the skull. If the clots are not removed at this stage, a thick membrane of scar tissue will develop. Ordinarily, a baby's brain more than doubles in size

during the first two years of life. The thick, nonelastic membrane from the clot, however, will prevent the infant's brain from growing and thus doom the baby to feeble-mindedness.

More than 70% of the babies operated on have developed normally. In the rest, so much damage already had been done to the brain that the children are grossly retarded mentally.

The Boston doctors reported experience with 150 babies. They believe the condition is much more common than generally supposed, and they urged doctors to be on the alert for it.

Symptoms are not very specific, but doctors should suspect the condition, they said, in any baby who is not gaining weight, refuses feeding, has a slightly enlarged head and is very irritable. The babies may also have convulsions.

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The barrel-bellied tree of Brazil, the Brazilian *barriguda*, is found in the semi-arid northeastern district of the country; it conserves moisture in its enormously swollen trunk.



"THAT MOTHERS MIGHT LIVE"—This medical painting by Dean Cornwell had its premier showing at the American Medical Association convention in San Francisco. It shows Oliver Wendell Holmes, famous doctor and poet, reading a paper proving that childbed fever is contagious. Doctors were skeptical at first, but later became convinced, and as a result of Holmes' famous essay, childbearing was made safer throughout the world. Wyeth Incorporated, Philadelphia, commissioned Cornwell to do the painting for its "Pioneers of American Medicine" series.

ECOLOGY

Aftermath of Bomb Blast

Underwater explosion scheduled next. Scientists believe concrete is best protective structure. Surviving animals may still be in danger.

By DR. FRANK THONE

Science Service Crossroads Correspondent

See Front Cover

► THE UNDERWATER explosion planned for later this month at Bikini will have less heat and radioactive effects on the Navy's target ships, it is believed. Will its water-conveyed concussive effect rip open the bottoms of even the stoutest of warships? That is what we are waiting to see.

An atomic bomb, bursting in air near a well-built warship, even an old one, will not sink it, but it will so batter and blast its decks and upper works that little or nothing about them will be of any use afterwards, even in the unlikely event that any crew members were left alive in such exposed or thinly sheltered positions. That is the best judgment that can be reached after a view of the lagoon at Bikini after the atomic bomb blast.

On all ships within a half-mile radius of the target center, the upper works—masts, funnels, boats, bridges, ack-ack gun nests—are visibly knocked about from some distance away. A closer view shows more completely detailed ruin.

The picture on the cover of this SCIENCE NEWS LETTER, which is a Joint Army-Navy Task Force One Telephoto through Acme, shows the heavy cruiser, *USS Pensacola*, in Bikini lagoon after the blast with her superstructure severely damaged.

Outside this center circle of heaviest damage there is another half-mile zone of lesser, but still severe, wrenching and smashing, probably sufficient in many cases to put ships out of action at least temporarily.

The damage we saw at first was caused primarily by the bomb's blast or concussion. Its terrific heat started most of the fires; some of these, however, originated from secondary causes. The same heat would have aided concussion in killing exposed personnel.

The bomb's third effect, loading with radioactivity nearby water and all things exposed above it, may still be operating in parts of the target area.

An air explosion attack with an atomic bomb, therefore, can disable ships and kill or cripple their exposed personnel with its triple effect of concussion, heat and radioactivity. It will not sink large warships.

Concrete Protection

Concrete will be the best as well as the cheapest material for protective structures if we have to build against the risk of an atomic bomb war. Dr. Karl Compton, president of the Massachusetts Institute of Technology and chairman of the evaluation board of the joint chiefs of staff, told newspapermen aboard the *USS Apalachian*.

Dr. Compton was impressed, as were the newspapermen when they toured the target area, with the way two concrete craft had stood up under the blast. Steel ships all around them were heavily damaged, but a floating drydock and an oil barge built of concrete showed no cracks. The oil in the barge had burned, but the barge itself was not harmed and is still afloat.

Dr. Compton also called attention to the way certain modern concrete, earthquake-proof buildings in atom-blasted areas of Japan had survived.

As additional support for his idea, he pointed out that six feet of concrete is considered sufficient protection around the largest cyclotrons, and this should be enough to afford radiological protection against known kinds of atomic bombs. It would also be enough for protection against explosion blast except from very near hits.

Such shelters presumably would have to be made independent of outside air for ventilation, at least for some days, to prevent harm from radioactive contamination from that source.

Still in Danger

The animals that survived the atomic bombing are not safe yet. Despite the astonishing survival of these goats and pigs their troubles may just be beginning.

If their reactions are similar to those

of human beings, here is a list of diseases they may develop from having lived through the blast of an atomic bomb:

1. Anemia, due to the destruction of the parent cells of red blood corpuscles.

2. Leukopenia or agranulocytosis, resulting from an analogous suppression of white blood cells

3. Purpura, a kind of bleeding that follows the destruction of blood platelets that aid in clotting.

4. Infections, that may invade the body through its weakened defenses

5. Liver degeneration, resembling toxic hepatitis.

6. Degeneration of the sex glands in both the male and female; this, however, is not necessarily permanent.

7. Loss of hair, which again may not be permanent.

8. Cancer possibly, but data from Japanese explosion sites are not old enough or numerous enough to prove anything.

The animals that preliminary survey crews found when they went aboard the target ships are going to be watched carefully for quite a long time to see if any of the ailments on the list, supplied by one of my cabin-mates, Dr. William Hitzig of New York, develop.

On the whole the animals survived their little sample of hellfire most amazingly. On the old *Pennsylvania*, for example, 10 goats and 10 pigs had been left behind, and they were all found alive and in no apparent distress. On one of the transports, the story was almost the same, only one of the goats had died.

Most astonishing, however, was the score on the *Nevada*, the ship marked in red for the bullseye of the target. It had been a close hit too, for most of the red paint on her port side had been blasted black, much of her superstructure smashed and the lighter items of Army ordnance on her after deck had become piled-up junk.

Yet all the pigs and goats placed on her foredeck were alive and at least one goat had survived the moment of inferno near her stern, though he was reported sick.

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The *blackeye pea*, or bean, came from Europe to the American colonies at an early date; it was introduced into Virginia by George Washington, and called the cowpea by Thomas Jefferson, who believed it native to America because used by Indians.

AERONAUTICS

Unconventional Planes

Navy's new fighter plane, XF5U-1, and Army's Flying Wing have unconventional designs which eliminate body drag. Other new designs have revolutionary features.

➤ THE NAVY'S new turtle-shaped experimental fighter XF5U-1, now ready for flight tests, is as revolutionary in appearance as the Army's new Flying Wing.

Both are part of a new trend in air-frame conformation to eliminate the body-drag of the fish-shaped fuselage of the conventional aircraft.

The new Navy plane has short dwarfed wings but depends for supporting lift in flight largely on its broad flat under-surface.

The Flying Wing is all wings. It is composed of two broad hollow wing-shaped parts joined in a wide-spreading V at their bases with space within them at the junction to hold crew and equipment.

There are many differences in the two planes. The Flying Wing's four engines are tucked away inside the wings on their rear edges and operate pusher propellers.

The Navy plane's two engines are prominently located at the outside corners of the craft's squared-off front with the puller propellers well forward. An important feature of this plane's power arrangement is that either engine can operate both propellers if one engine is blacked out.

The new Navy plane, built by Chance Vought Aircraft, has range of speed from extremely slow to extremely fast. It may prove to be the world's fastest propeller-driven plane. It will have a speed range from 40 to 425 miles per hour with its present two-speed engines. With the addition of water-injection its range will increase to from 20 to 460 miles an hour. Later, with gas turbines, the top speed may approach 550 miles.

The British also are experimenting with revolutionary types of planes. A plane like the Army's Northrop Flying Wing is in advanced stages of construction. This English version will be jet-powered, it is reported, and will be able to cross the Atlantic in from seven to eight hours.

The Flying Ram XP-7A, also an Army Northrop plane of the Flying Wing type,

is a bat-like craft which the pilot operates lying down with a bullet-proof glass bubble over his head. In this prone position he can go through maneuvers not dreamed of in other types. It has now been flight-tested. It is designed for ramming enemy aircraft at speeds approaching the velocity of sound. It is constructed of magnesium with knife-like wings, and, because of the material used, its design and speed, it is almost invisible as it shoots through the air.

A rocket-powered plane, another craft of unconventional design, built for the Army by Bell Aircraft, is now ready for trial. It is designed to travel faster than the speed of sound. It has already been tested without engines by taking it to great heights and using gravity for power. It is rocket-powered so that it can travel at high altitudes where jet engines can not be used because of the lack of oxygen. It is the XS-1.

Science News Letter, July 13, 1946

PHYSICS

Guggenheim Awards for Atomic Control Study

➤ A STUDY of the domestic development and control of atomic energy will be made by James R. Newman, science chief for the Office of War Mobilization and Reconversion and adviser to the Senate Atomic Energy committee. Mr. Newman was awarded one of 12 post-service Guggenheim fellowships.

Dr. John Archibald Wheeler, Princeton associate professor of physics, will work on electron theory with Prof. Niels Bohr in Copenhagen under one of the fellowships.

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From Page 19

Myers, O'Mahoney, Overton, Pepper, Radcliffe, Russell, Swift, Taylor, Thomas, Utah; Tunnell, Wagner, Walsh.

Republicans for—(10)—Aiken, Donnell, Ferguson, Hart, Knowland, Langer, Morse, Smith, Wiley, Young

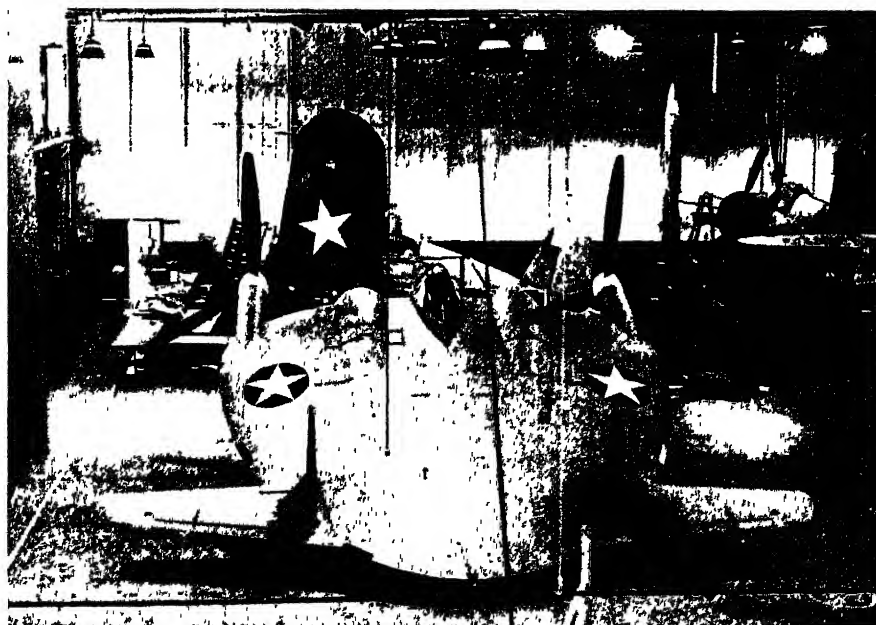
Progressives for—(1)—LaFollette.

Against the bill—18.

Democrats against—(2)—McKellar, O'Daniel.

Republicans against—(16)—Ball, Bridges, Brooks, Buck, Capehart, Capper, Gurney, Hawkes, Millikin, Moore, Robertson, Stanfill, Taft, Wherry, White, Willis.

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XF5U-1—The Navy experiments with new high-low speed fighter, developed by Chance Vought Aircraft. This revolutionary plane is being made ready for flight tests, and has as its chief new features the reality of extremely high and low speeds in the same plane, as well as one engine being able to turn over both propellers in the event of a failure.

DENTISTRY

Dental Records Would Identify Unknown Dead

➤ FEWER TRAGIC cases of unknown dead, whether soldier or civilian, would result if a system of identification through teeth were adopted, Dr. Lloyd G. Welty, of San Francisco, former lieutenant colonel in the Army Dental Corps, and Randall R. Glasgow, also of San Francisco, and a former Medical Administrative Corps captain, suggest.

Details of a system by which dental records could be translated into numbers to be punched on automatic machine record cards are reported by these two in the *Journal of the American Dental Association* (June).

Teeth are relatively indestructible and the teeth in no two mouths are exactly alike. Identification might be more difficult in the case of a person with a complete set of false teeth, or who had a complete set of perfect natural teeth. These difficulties could be overcome, however, by stamping the patient's full name into the false teeth and by casts taken of the natural ones.

Military services and insurance companies could apply the system almost immediately. Universal use throughout the nation would require that all persons have dental examinations but this, Dr. Welty and Mr. Glasgow point out, would be a great step toward extending dental service and education to the public.

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ELECTRONICS

High Frequency Current Detects Weakness in Metals

➤ WEAK SPOTS developing in metals at work in machines and cables, due to stresses and fatigue, can be located and replacements made before failure occurs by use of high frequency electricity.

How this is done was told to the American Society for Testing Materials by P. E. Cavanagh of Allen B. Du Mont Laboratories.

"High-frequency core losses can be used to detect incipient failure in metals where such failure is preceded by plastic deformation," he said. To determine the losses an instrument known as a cyclograph is used.

Inspecting a mine-hoist rope is one example of where this method may be applied. A hoist rope in good condition,

working at normal loads, will last indefinitely. However, corrosion, abrasion, bruising and kinking may seriously weaken a rope locally and give rise to failure.

Whatever the cause of failure, he continued, the unit stresses in the part of the rope where failure is started will be higher than in the rest. These higher stresses can be detected by the cyclograph because core losses are different where the higher stresses occur.

In practice, a cyclograph recording is made of the condition of the entire rope when first installed, and at definite intervals later. Tests must be made with a known load on the rope. Any variation from the standard recorded pattern at any point can be due only to the beginning of plastic deformation. The amount of variation determines if the rope is no longer safe for use.

"In order for any type of failure to occur in metal some permanent distortion of the crystal lattice must take place beforehand," Mr. Cavanagh stated. "This distortion will change the magnetic and electrical properties" and may be detected with the cyclograph.

Science News Letter, July 13, 1946

AERONAUTICS

Square-Tipped Propeller Resembles Windmill Vanes

➤ SQUARE-TIPPED propeller blades for aircraft, resembling in appearance the vanes of an old Dutch windmill, may become common on certain types of planes. Their use is a return to the shape employed by the Wright brothers in their early plane.

These square-tipped blades are the results of extensive studies in aerodynamics, and are designed to maintain high thrust as airplane speeds approach the speed of sound. Instead of being elliptical they are almost rectangular in shape, with extra width added at the tip. Their increased wideness is one of their advantages.

This shape, the designers claim, affords the maximum increase in blade power absorption with the minimum weight increase. The earliest version of the modern square-tipped blade was used on the North American P-51 Mustang, and an improved type will be used on the twin-engine Martin 202 and the Consolidated Vultee 240. The new blade was developed by Hamilton Standard Propellers division of United Aircraft Corporation.

Science News Letter, July 13, 1946



TOXICOLOGY

Don't Mix DDT with Chewing Tobacco

➤ DON'T MIX DDT with chewing tobacco seems to be the moral of a report from Dr. M. I. Smith of the National Institute of Health in the *Journal of the American Medical Association*. (June 8).

A farm hand in the employ of Dr. Paul Bartsch of the U. S. National Museum accidentally did so and as a result was mildly poisoned.

The accident occurred because he carried a bottle containing a solution of DDT in kerosene in his pocket along with his chewing tobacco. The cork of the DDT bottle came loose and an undetermined amount of the insect spray got on the tobacco.

Without noticing the odor or taste of the kerosene, the man chewed a plug. Within two hours he became nauseated, vomited, suffered anxiety, and had stiff painful jaws. These last symptoms, which lasted for several hours, appear in Dr. Smith's opinion to be the counterpart of the overexcitability and muscular tremors and twitchings seen, especially around the head, in animals that have had a toxic dose of DDT. The man also had a sore throat which lasted two or three days.

Scientifically, the case is of interest because it shows, for the first time, what happens to DDT when it gets into the body of a man. Previous studies had been made on rabbits. Unchanged DDT, Dr. Smith found, was excreted by the kidneys.

Science News Letter, July 13, 1946

BIOCHEMISTRY

Prize for Plastics And Films from Blood

➤ RESEARCH leading to development from blood of fibrinogen plastic and fibrin tubes and films has won for Dr. John D. Ferry, 34-year-old assistant professor of chemistry in the University of Wisconsin, the \$1000 Eli Lilly prize for outstanding achievement in biochemistry. The award will be presented at the meeting of the American Chemical Society in Chicago in September.

Science News Letter, July 13, 1946



ENGINEERING

Suction Flatiron Dries And Presses at Same Time

➤ GOODS too wet to iron with ordinary flatirons are quickly dried and pressed with a new household suction iron on which patent 2,402,575 was granted by the U. S. Patent Office. It involves the creation of a partial vacuum between the flatiron and the goods to remove the steam.

The face of this electrically heated flatiron has a number of small channels or grooves radiating out from a common center. A nipple extends through the ironing sole plate at this center with perforations for each channel. A suitable pump, located in the body part of the device, sucks up the steam that is generated between the hot sole and the material. The result is rapid drying followed by quick smoothing.

By a simple arrangement the pump and the heating elements are on the same circuit so that only one electrical connection to the house current is needed. The inventor is August C. Purpura of Chicago.

Science News Letter, July 13, 1946

MEDICINE

Atabrine Makes Toe And Finger Nails Glow

➤ TOE AND finger nails shine with a brilliant yellow-green light when a person who has taken anti-malarial doses of atabrine (quinacrine hydro-chloride) is exposed to ultraviolet light.

This new test for this antimalarial drug widely used in the armed forces in the Pacific was independently discovered by three doctors and reported in the *Journal of American Medical Association* (July 6).

Dr. Julius E. Ginsberg, dermatology professor of the Northwestern University Medical School, Chicago, who had taken atabrine regularly for two years as an army physician in the tropics, noticed the fluorescence of his own fingernails when examining a child under Wood's light, as physicians call ultraviolet. Col. Paul L. Shallenberger of Gardiner General Hospital, also of Northwestern, had noticed similar fluorescence.

At the Mayo Clinic, Rochester, Minn., Dr. Robert R. Kierland noticed the intense fluorescence of his own fingernails. He had returned from the Southwest Pacific where he had taken atabrine daily for almost two years.

From tests upon hundreds of patients, some of whom had taken atabrine over long periods, Drs. Ginsberg and Shallenberger concluded that the greenish-yellow fluorescence can be used as a means of checking whether atabrine is being used as an antimalarial.

The temporary yellow discoloration of the skin, observed in many veterans who served in the tropics, and bluish pigmentation of the nails and palate following atabrine use, are not associated with the fluorescence.

Science News Letter, July 13, 1946

PHYSICS

Synthetic Fuels Demonstrated by Navy

➤ WORLD'S LARGEST consumer of oil, the U. S. Navy, has demonstrated how synthetic gasolines, diesel fuels and lubricants can be used successfully in ships and engines.

Announcing plans for a long term study of synthetic fuels in cooperation with the oil industry and engine manufacturers, officials at the Naval Engineering Experiment Station used fuels made from natural gas, shale, and coal to operate landing craft, amphibious tanks and an experimental gas turbine and turbo-jet engine. Both synthetic fuels and blends of synthetic with natural fuels were shown to be efficient in the tests.

The Navy's program of synthetic fuel study began in 1944 when laboratory experiments showed that high cetane diesel fuel could be made from natural gas blended with low quality natural fuel. The wartime shortage of high cetane diesel fuel was solved by other means, but the research on synthetic fuels was continued.

This demonstration, the first full-scale showing of synthetic fuels in the United States, included American petroleum manufacturers and one French firm, Kuhlman Company, which made diesel fuel from coal under a special contract with the Navy.

Postwar research on synthetic fuels is being continued by the Navy Cooperative Committee on Fuels and Lubricants.

Science News Letter, July 13, 1946

ASTRONOMY

Comet Brooks Spotted Near Predicted Position

➤ A FAINT COMET now to be seen through big telescopes in the constellation of Pisces, the fishes, is the periodic comet Brooks, returned again to earth.

The comet was located close to its predicted position on June 29, by Dr. Hamilton M. Jeffers of the Lick Observatory of the University of California.

When discovered, the comet was very faint, being of the 18th magnitude. It is expected to become brighter during the next month or so as it gets close to the sun, but will probably not be bright enough to be seen with the naked eye.

One of several comets expected to visit the region of the earth this summer, this comet was first discovered in 1889 by W. R. Brooks, great American comet-finder. It has been seen upon practically all of its return visits at seven-year intervals.

Nothing was reported about the tail of this comet, a small spot of brightness moving slowly across the sky.

The comet is expected to be brighter after perihelion passage on Aug. 25 than before this closest approach to the sun as it will be getting nearer to the earth. It will come within about 91,600,000 miles of our planet. On Oct. 27 it is expected to be in the constellation of Aries, the ram.

Science News Letter, July 13, 1946

ENGINEERING

New Synthetic Grease Can Replace Many Old Types

➤ A BUTTERY, light tan grease has been developed that can replace four aircraft greases required for use over an operating temperature range of 100 degrees below zero Fahrenheit to 300 degrees above. Believed to be usable over a wider range of temperatures than any other aircraft lubricant, this super grease was developed by the Texas Company at the request of the Navy.

Instead of being made from either a vegetable or mineral oil, the oily constituent is strictly a synthetic compound. This grease of many uses, that can be substituted for both easy pouring and thick varieties, has a lithium base. It will be used on all types of control bearings, actuators, aircraft instruments, aerial cameras and the fly-power motors in radar equipment.

Science News Letter, July 13, 1946

PHYSICS

Seeing With Heat Waves

"Snooperscope," infra-red receiver, converts invisible light into visible image, enabling objects to be seen and located in the dark.

By A. C. MONAHAN

➤ "HANDS UP or I'll shoot!"

This order pierced the dark of night, and the thief obeyed the order of the policeman who had surprised him.

"How did you see me breaking into the back entrance?" the prisoner asked. "I couldn't see where I was going myself."

The policeman told him he used his snooperscope.

Thanks to infra-red radiation and new devices for making use of this invisible heat-light, the guardians of the law will soon be using the same kind of applied science that tricked the Japs on Iwo and other tough, bloody islands.

For GIs in the closing months of the war could see in the dark, without being seen.

The snooperscope the policeman mentioned has a companion device called a sniperscope. In general they are identical. The first is a complete instrument held in front of the user by one hand. The other is in two pieces that are attached to a carbine.

Both have an infra-red lamp that sends out an invisible beam of what some call "black" light. Both have receivers that pick up returned light from the object observed and convert it from invisible light to a visible image. The object appears greenish in hue, but is plainly outlined.

Infra-red rays played other important roles in the war. They were used for the quick drying of protective coatings on tanks and soldiers' helmets, and for warming up engines in jeeps and trucks. They were also used in photography, enabling camera men high in airplanes to take accurate pictures of camouflaged enemy installations and ships at sea, and also to snap photographs through haze.

They were used to detect impurities in certain chemical solutions, and in medical treatment. Both Japs and Germans employed them in a short-range system of telephonic communication where wires could not be used and radio would be detected.

Peacetime Uses

Peacetime applications of infra-red rays in drying, heating, medicine, chem-

istry and photography are self-evident. Scientists are developing their use in communication systems. Even the snooperscope has possibilities, particularly in navigation.

Infra-red equipment was successfully used by the Navy during the war. Vessels used the "black rays" in signalling to each other. The signals could be picked up only by ships equipped with receivers similar to those on the sniperscope.

Also naval boats hung infra-red lamps on their masts at night which gave all vessels in a formation the location of every other ship. This system is usable on commercial ships. Snooperscopes can be used by ship lookouts without the usual eyestrain, and by river pilots who with them can be certain of river banks and obstacles ahead.

Scientists talk about so many different "rays" these days that the layman is often confused. Infra-red rays are often called thermal or radiant rays because heating power is an important characteristic. The length of the waves with which light and invisible energy rays travel through space is their distinguishing feature. Cosmic rays, gamma or radium rays, X-rays, ultraviolet rays, visible light rays, infra-red rays and electro-magnetic rays are merely rays of different wavelengths.

Visible Rays on Human Eye

The rays that form pictures on the retina of the eye are the so-called visible rays, but even they include rays of different wavelengths. When a beam of white light, such as that from the sun, is passed through a glass prism onto a screen, a spectrum or band of colors is formed on the screen. That is because the rays of various lengths are not bent the same amount in passing through the glass. The shorter the wave, the more it is bent away from a straight line.

The visible spectrum of white light includes violet, indigo, blue, green, yellow, orange and red, each shaded off into the next. Color is a matter of wavelength. The red has the longest wavelength of the visible spectrum, the violet the shortest.

Visible light rays, however, form but a tiny portion of the entire spectrum. There are invisible rays with wavelengths much longer, and others much shorter, than those we can see. Those shorter



Bell & Howell Photo

SNIPERSCOPE—Used by the Army and Navy for night operations, this instrument converts invisible light to a visible image.

than the violet are the ultraviolet, X-ray, radium and cosmic rays in the order named. Longer than the red wavelengths are the infra-red waves, short radio waves and then the long radio waves.

All waves, regardless of their length, may be absorbed and their energy converted into heat. But the infra-red waves result in more heat than the color waves. That is how they were discovered. A scientist, nearly 150 years ago, taking temperatures in the visible spectrum, found that beyond the red higher readings prevailed. He concluded, therefore, that at that point there must be invisible rays.

Enemy Systems Similar

The German and Japanese systems of using infra-red rays to communicate across wide rivers, deep gorges and to front line troops were similar. German equipment, captured in 1944, was brought to America for study and testing. It is able to convert spoken words into modulated infra-red rays and send them through space for several miles to a receiver which picks up the invisible light and turns it back into speech.

The scheme is not new. Alexander Graham Bell used it in 1880 in his photophone, and the principle had application in World War I. The Nazi instruments used varied in weight from 30 to 210 pounds, exclusive of their power units, and resembled searchlights on tripods. They had a range of 10 miles under good conditions. The receiver had to be in the line-of-sight, because infra-red rays, like ordinary light rays, travel in straight lines.

The sniperscope, attachable to the carbine, has one part under the barrel and one over. The under part is the tube containing an infra-red lamp. The face of the tube is painted black so that no visible light can escape. The upper mounting is a special telescope, the receiver for the reflected rays. Both are powered from a supply unit carried on the user's back which contains a six-volt battery and a vibrator.

The transformation inside the telescope receiver that receives the reflected invisible rays and makes a visible image is brought about by the use of electrons inside the tube of the instrument. The reflected infra-red rays picked up on the objective lens are focused on an image tube. When they strike this image tube, electrons are released in direct proportion to the intensity of the rays.

As all electrons possess a negative electric charge, the released electrons are attracted to a positive plate. They are accelerated as they pass through the tube to a fluorescent screen. They bombard the screen and produce a visible image corresponding to the invisible infra-red image on the front screen. The power for action is from the vibrator.

The usual snooperscope is carried by hand in front of the user, but there is another kind. In this the device to shoot out the infra-red beam is mounted on

the front of a jeep or tank and the driver is equipped with head-gear, a so-called infra-red-sensitive helmet, with the receiving telescope attached to its visor.

The infra-red lamp used in the snooperscope consumes five amperes at six volts. The receiving tube requires 4500 volts, which is supplied by the vibrator in the power supply unit.

Nazis, as well as Allies, had an infra-red night-seeing instrument called a "heat-eye tube." It (*Turn to next page*)



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Do You Know?

Spring shrubs are best pruned just after the blossoms fade.

Bacteria are found at greater depths in soil or in ocean muds than any other living animals.

Dinosaur remains have been found on every continent but always in deposits of the Mesozoic age.

Breaks in the bark of *dogwood trees* should be treated promptly with paint or shellac to keep out woodboring insects.

New process in *sugar making* from beets or cane, that uses ion exchange resins, saves costs, increases the amount of sugar obtained, and yields a sugar syrup edible by humans instead of the former "blackstrap."

Carnauba wax, used to polish floors, furniture and automobiles, is obtained from a South American tree that yields well only in semi-arid regions; the wax is a natural secretion during dry periods to protect the leaves.

The *thickness* of thin glass with parallel faces can be determined by the reflection of light: a tiny beam of light striking the glass is reflected from both surfaces and the thickness determined by measuring the displacement of the two images.

YOUR HAIR AND ITS CARE

By O. L. Levin, M. D. and H. T. Behrman, M. D.

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was a mass-produced cathode tube powered by a midget generator.

With it the Germans used a searchlight with the lens painted out to block the emission of any visible light. In the receiving heat-eye tube, the reflected heat-image fell on a selenium film and dislodged electrons were drawn magnetically through a vacuum tube and focused directly on a fluorescent view-piece. American scientists, however, are working out improved snooperscopes, and also better methods of using infra-red rays in telephonic communication.

Super-Sensitive Eye

A super-sensitive, super-conductive bolometer, developed at Johns Hopkins, was used in recent experiments in sending heat signals over telephone wires from Baltimore to Atlantic City. A bolometer is a delicate heat detecting or measuring instrument.

This bolometer, a delicate infra-red "eye," contains metal strips whose electrical conductivity is altered by heat waves falling on them. When hit by a heat ray that warms it only one millionth of a degree, it gives a clear electrical signal. It can register the heat from a living person 500 yards away, and when attached to a scanning device, a television-type viewing screen, can produce a rough picture of any warm object.

In this bolometer, columbium nitride is used for its sensitive receiving surface. This rare-metal nitrogen salt is cooled by the use of liquid hydrogen to 432 degrees below zero Fahrenheit, at which temperature its electrical resistance is exceedingly low. For this reason, it is superconductive. In the Baltimore experiment, heat rays from various objects, and from a man, were picked up by the bolometer, and the variations transformed into sound.

When it is remembered that every object hotter than its surroundings gives off radiant heat—infra-red rays—special uses of a delicate bolometer become apparent. As examples, heat escapes from a building can be detected, or a distant aircraft with its hot engine or propelling jet, or again, the extremely hot flame and tail of a rocket even scores of miles away.

Science News Letter, July 13, 1946

Hydrogen for meteorological balloons was obtained by the Army during the war from a sodium borohydride compound and water by the addition of an acid-forming compound, such as boric acid, or by certain catalysts.



NIGHT EYES—This RCA Type 1P25 infra-red light tube was the eye of the electron telescope used by the Navy to conduct landing, reconnaissance and offensive operations as well as code communication by blinker lights under cover of absolute visual darkness.

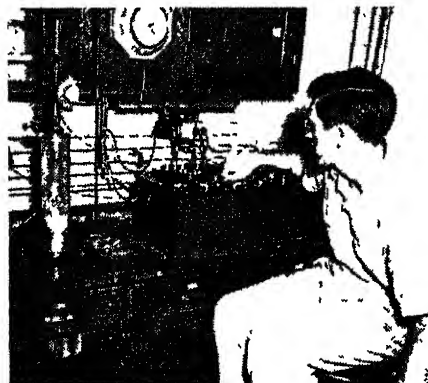


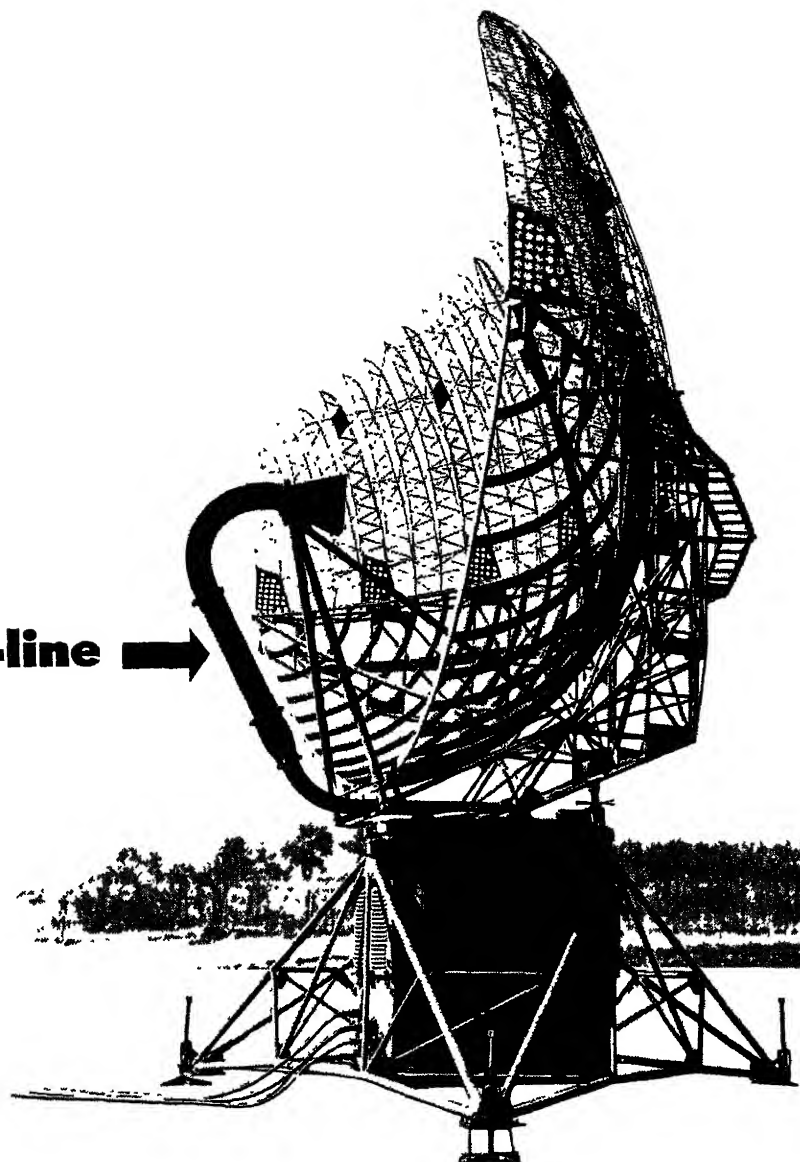
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electrical pipe-line →



Microwaves make their journey from apparatus to antenna not by wire, cable, or coaxial — but by waveguide.

Long before the war, Bell Laboratories by theory and experiment had proved that a metal tube could serve as a pipe-line for the transmission of electric waves, even over great distances.

War came, and with it the sudden need for a conveyor of the powerful microwave pulses of radar. The

metal waveguide was the answer. Simple, rugged, containing no insulation, it would operate unchanged in heat or cold. In the radar shown above, which kept track of enemy and friendly planes, a waveguide conveyed microwave pulses between reflector and the radar apparatus in the pedestal. Bell Laboratories' engineers freely shared their waveguide discoveries with war industry.

Now, by the use of special shapes and strategic angles, by putting rods

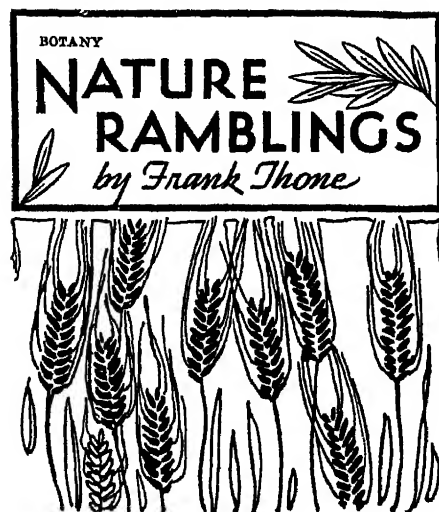
across the inside and varying the diameter, waveguides can be made to separate waves of different lengths. They can slow up waves, hurry them along, reflect them, or send them into space and funnel them back.

Bell Laboratories are now developing waveguides to conduct microwave energy in radio relay systems, carrying hundreds of telephone conversations simultaneously with television and music programs.

EXPLORING AND INVENTING, DEVISING AND PERFECTING FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE



BELL TELEPHONE LABORATORIES



The Greatness of Grasses

➤ GRASS, the type and symbol of weakness and impermanence in more than one Biblical poem and parable, is nevertheless, solid material foundation on which all civilization is based. For civilization began after men learned to be farmers, and had no further need to follow the nomadic, unsettled life of a hunter. Farming, and the city cultures that grew out of it, has always been primarily a growing of grain—and all grains are grasses. There have been at least three independent origins of farming in the history of the world, and each

one took place in connection with a grain culture: barley and wheat in the Near East, rice in southeastern Asia, maize or Indian corn in tropical America. Nobody knows when or precisely where some primitive groups of half-savages began purposely to plant the grains they had previously gathered casually from the wild state, and so established the first permanent villages, that later grew into towns, then cities, where division of labor and a release of at least a few of the people from the constant necessity to concern themselves with the immediate production of food permitted the growth of the arts and the development of learning.

Not only have the high civilizations been founded on cultivated grasses, the marginal cultures, based on a pastoral way of life, have been dependent on grasses as well—usually, of course, the native uncultivated species. Wherever shepherds have driven their flocks and cattlemen tended their herds, grass has been of vital importance, and pasturage rights the subjects of conflicts and treaties. This was true in the days of Abraham; it is still true in the American West.

In the tension zones between the tall-grass country that is the natural site of highly developed agriculture and the drier short-grass country that is good only

for grazing, another group of grasses makes possible a more precarious type of agriculture—the millets, sorghums, Sudan grasses and other coarse, lusty, drought-resistant plants that are more dependable than wheat or even barley on such lands as our own High Plains, and Inner Mongolia, and the South African Veldt. Their stalks and leaves make fodder, their seeds are sometimes ground as grain. They woo the herdsman away from his nomadic life and begin to make a farmer of him.

Other grasses besides grains are of high importance to man. Bamboo is the universal building material in all the rice-eating lands, its shoots and sometimes its seeds serve as food as well. Sugarcane, another giant grass, has been the basis for any number of tropical colonial empires. Sod huts in our Western pioneer days were only a temporary and makeshift device of American living; but grass huts, and grass-thatched houses, permanently shelter millions of the earth's inhabitants.

Science News Letter, July 13, 1946

CHEMISTRY

Synthetic Egg White Made from Codfish

➤ EGG WHITE, exclusively a hen product for centuries, now has competition in a German synthetic substitute made from fish. For a decade or so this fish product was kept a secret, but postwar American investigators found it, analyzed it, ate it, and say that it has only a very slight fishy flavor.

The investigators learned that it has been used successfully for food and technical purposes in Germany since 1934. It is made from fresh codfish but can be made from dried codfish or steam-dried shrimp. It can be used the same way as egg white and is said to have superior whipping qualities. Being about 94% protein, it has excellent food value.

This synthetic egg white is made by a process that involves removing readily soluble proteins in the fish with dilute acetic acid and extracting fats with trichlorethylene. The extracted tissue then is stirred in warm dilute sodium hydroxide, and the partly hydrolyzed protein is neutralized with acetic acid and spray-dried into a white powder.

Complete information on this synthetic substitute for egg white is given in a report issued by the Office of the Publication Board, U. S. Department of Commerce.

Science News Letter, July 13, 1946

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• Books of the Week •

AIRPORT PLANNING—Charles Froesch and Walther Prokosch—*Wiley*, 250 p., tables and diagrs., \$7.00. An analysis of basic problems in airport planning and design, presented from a functional viewpoint.

ATOMIC ENERGY IN INTERNATIONAL POLITICS—Harold C. Urey—*Foreign Policy Assn.*, 11 p., paper, 25 cents. Foreign Policy Reports, Vol. XXII, No. 7.

BIOLOGY FOR YOU—B. B. Vance and D. F. Miller—*Lippincott*, 731 p., tables and illus., \$2.28. A textbook for use in the high school. The authors have endeavored to include material which will be directly related to the past experiences and future needs of the individual, and to inculcate principles of scientific thinking.

THE GENUS BAZZANIA IN CENTRAL AND SOUTH AMERICA—Margaret Fulford—*Chronica Botanica*, 175 p., diagrs., paper, \$5. A critical monograph of one of the most interesting genera of liverworts. *Annales Cryptogamici et Phytopathologici*, Vol. III.

THE GREAT STALIN FIVE-YEAR PLAN—*Embassy of the Union of Soviet Socialist Republics*, 56 p., illus., paper, free. The plan for the restoration and development of the national economy of the USSR for 1946-50.

THE INDIANS OF THE SOUTHEASTERN UNITED STATES—John R. Swanton—*Government Printing Office*, 1050 p., tables, illus., and maps, paper, \$2.75. Sketches of the Southeastern tribes and their population, with chapters giving details of their many customs and activities. Smithsonian Institution, Bureau of American Ethnology, Bulletin 137.

LECTURES ON PSYCHOANALYTIC PSYCHIA-

TRY—A. A. Brill, M. D.—*Knopf*, 292 p., \$3. Lectures which were originally given by Dr. Brill at the New York Psychiatric Institute from 1926 to 1942, explaining the history, meaning, and applications of psychoanalysis.

MEDICAL EDUCATION AND THE CHANGING ORDER—Raymond B. Allen—*Commonwealth Fund*, 142 p., \$1.50. A book about the development of medical education, showing how it is an integral part of the whole educational process from childhood to retirement from active life, and pointing out some of the difficulties of present-day medical training and suggesting possible ways of overcoming these inadequacies.

PSYCHOLOGY OF INFANCY AND EARLY CHILDHOOD—Ada Hart Arlitt—*McGraw-Hill*, 475 p., illus., \$3.75, 3rd ed. The principles of child psychology given a scientific and practical treatment, with emphasis on the actual behavior of children and interpretation derived from case studies. This new edition covers major researches of the past 14 years.

SUN, MOON AND STARS—Astronomy for Beginners—William T. Skilling and Robert S. Richardson—*Whittlesey House*, 274 p., illus., \$2.50. A simply written book especially for teen-age readers.

THROUGH THE STRATOSPHERE—The Human Factor in Aviation—Maxine Davis—*Macmillan*, 253 p., \$2.75. A record of the evolution and use of a vast number of devices evolved by the air forces for enabling men to be healthy and comfortable in the air.

Science News Letter, July 13, 1946

militarism as ever existed, but in only a few hundred years Denmark, Sweden and Norway have developed a non-militaristic type of culture which ranks among the highest of any of the cultural patterns in the world.

"It is possible, therefore, to alter cultural patterns rapidly. In any attempt to build a culture in which man can get along with his fellowman and in which war will not be acceptable, certain concepts are fundamental. These, as I have stated before, are that any nation or culture is a collection of individuals, and depends upon the mental health and mental attitudes of these individuals for a healthy cultural pattern; that our first problem is suitable education of children, and that we must teach children to think clearly and logically, to face reality and to try to deal honestly and frankly with their problems."

Science News Letter, July 13, 1946

ENGINEERING

Stabilizer Promises Smooth Train Riding

➤ TRAIN passengers will have smoother rides, no matter how bad the road bed, thanks to an improved mechanical stabilizer. Working on the principle of a big spinning top, it tilts the body of the railway car at the proper angle on curves and stops sway on rough track.

Recent tests over a wide range of speeds and road-beds show great improvement in riding comfort when using this instrument, designed by Westinghouse laboratories. It utilizes a refinement of a gyroscopic stabilizer.

Designed to balance the effect of centrifugal forces, the device uses an auxiliary gyro that eliminates undesirable vibrations. It is an outgrowth of the gyroscopic tank-gun stabilizer that enables gunners to fire with great accuracy when speeding over rough ground.

Science News Letter, July 13, 1946

PSYCHIATRY

Good Advice to Sick World

➤ **Rx FOR EVERYONE** in a world threatened by war, strikes, famine and atomic bomb annihilation: Stop being an ostrich.

This, in effect, is the psychiatric prescription given by Dr. Karl Bowman, of the University of California Medical School, in his address to the American Psychiatric Association in Chicago.

"We have to a considerable degree," he stated, "a cultural schizophrenia which tries to avoid the unpleasant problems of the world by denying their existence."

"At the present moment when the threat of the atom bomb is such that even complete annihilation of the world is a possibility, there is a very considerable percentage of individuals who insist that it is childish to be concerned."

In other words, there are many people acting like ostriches sticking their heads in the sand, or like victims of the mental disease, schizophrenia, who retreat into

a dream world when the real world becomes too unpleasant.

Psychiatry cannot work miracles, in spite of the impression current novels and moving pictures give, Dr. Bowman cautioned. It cannot cure every mentally sick patient. But it has learned much about how they got sick and how such sickness can be avoided.

"Psychiatry has much to offer the world at this time," Dr. Bowman declared. "It can point out that the present suspicion and sensitivity among nations is in many ways comparable to that among individuals; that building up the mental health of individuals is the best way to build up national health."

"There are those who say that Germany and Japan are hopelessly militaristic, but there are some nations which have been extremely militaristic in the past but have changed. The old Norsemen were as pronounced an example of

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New Machines And Gadgets

☼ **CASTING REEL** for fisherman operates on precision ball bearing and is claimed to be the first of its kind ever developed. Gears, spool shaft and level wind worm all revolve on self-retained precision-ground instrument bearings which are sealed in a housing to protect them from sand and grit.

Science News Letter, July 13, 1946

☼ **SPRING SEAT** for the locomotive engineer combines a double-action, hydraulic shock absorber, variable spring and sway bar to protect the operator from the engine's jolts and jars. Its coil spring and the spring action is controlled by the shock absorber, and the sway bar reduces side motion.

Science News Letter, July 13, 1946

☼ **DUST PRECIPITATOR**, an electronic device, for installation in duct systems of industrial air-circulating and air-conditioning installations, frees offices, theaters and other buildings of air-borne dust and smoke. Small individual floor units, to be available later, will operate on household current.

Science News Letter, July 13, 1946

☼ **TOBACCO PIPE**, following engineering principles, has cooling fins around the stem that keep the smoke cool and sweet. Other engineering features prevent mouth moisture from making "goo" inside the stem. It has free and unobstructed draw, it is claimed, and is the "world's driest pipe."

Science News Letter, July 13, 1946



☼ **LAWN MOWER**, a 30-inch power operated machine, cuts and trims at the same time at a rate of a half acre per hour. The two horizontal circular cutting disks, shown in the picture, can cut close to a tree or fence post, and can be adjusted to cut high or close as desired.

Science News Letter, July 13, 1946

☼ **PASTEURIZER** for milk, two-gallon capacity, for use in homes where the commercially pasteurized product is not available, operates on the ordinary house electric current. It provides automatic timing and temperature control, and heat-

ing features comparable to larger commercial units.

Science News Letter, July 13, 1946

☼ **COOLING UNITS** for individual rooms in homes and office buildings are placed in windows to cool, filter, dehumidify and ventilate the air in the rooms. Each unit is housed in an attractive case, and is intended for home owners in low income brackets.

Science News Letter, July 13, 1946

☼ **PASSENGER RAMP** for airplanes is adjusted like an extension ladder to the proper plane-door level. It is made of aluminum, mounted on rubber tires, and weighs 875 pounds. Fully extended, it has 15 steps and two landings. By means of a single hand crank the top section slides under the lower section.

Science News Letter, July 13, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin #19.

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MEDICINE

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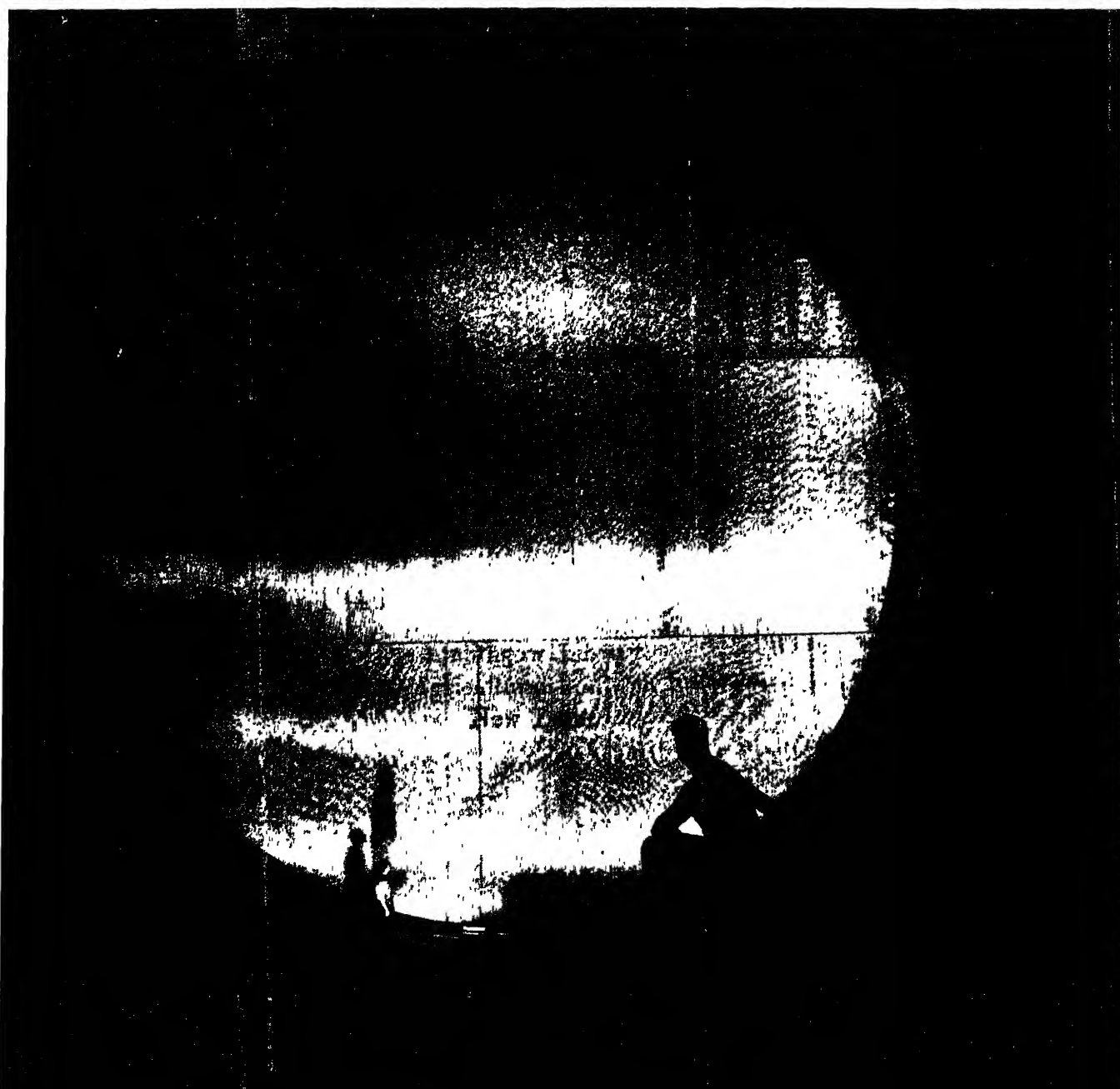
PHYSICS

What peacetime uses are planned for the "Snoopercoops"? p. 26.

Where published sources are used they are cited.

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SCIENCE NEWS LETTER



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MEDICINE

Disease Causes Found

The Donovan body, germ causing one type of venereal disease, has been found to cause some cases of arthritis and osteomyelitis.

➤ A NEW CAUSE for some cases of arthritis and the bone disease, osteomyelitis, was reported by Drs. John Lytford III, Robert W. Johnson, Jr., and Roger B. Scott of Johns Hopkins Hospital, Baltimore, at the meeting of the American Medical Association.

The cause is a germ called the Donovan body, Donovan being the name of the man who first discovered this micro-organism in patients suffering with a venereal disease, granuloma inguinale. This was then a very rare disease. Only 125 cases were known in the entire United States 25 years ago, but now that many may be seen every week in venereal disease clinics.

The disease, the Johns Hopkins group found, is not limited to the genital and inguinal region where it causes ulcers and buboes but spreads throughout the entire body. Bones, joints, soft tissues and internal organs may be affected. They also found that it may kill its victim, a fact which previously was not known.

The first ulcer may be missed or may be treated and heal and the patient apparently gets over the disease. The Donovan bodies, however, may be carried through the blood to other parts of the body to cause an apparently different sickness and even death years later.

One patient the group saw had symptoms that at first were diagnosed as tuberculosis of the hip. Other patients may have infectious arthritis or osteomyelitis.

Instead of being caused by staphylococci, streptococci or some other germ, the infection in these cases will be due to the Donovan body.

Two ways of detecting the true cause in such cases have been developed. One consists in removing surgically a small piece of joint lining tissue and examining it under the microscope. The other consists in examining the blood serum. Patients with granuloma inguinale will have a normal amount of albumin in their serum but greatly increased amounts of another blood protein, globulin. In no other disease is this albumin-globulin ratio reversed in this way, so far as is known.

While not all cases of arthritis or of osteomyelitis are due to granuloma inguinale, the Hopkins doctors think that in all cases for which no other cause can be found, doctors should look for this disease.

Unfortunately, so far there is no cure for the condition in any of its forms. Sulfa drugs, huge amounts of penicillin, arsenicals and fuadin have all been tried and failed. Hope for development of a cure, however, comes from the fact that Dr. Katherine Anderson of Vanderbilt University has been able to grow the Donovan bodies on chick embryos. This will make it possible to try in the laboratory all kinds of germ killers until one that can kill Donovan's bodies with safety to the patient is found.

Science News Letter, July 20, 1946

spherical bulge in the tunnel in which are stretched eight fine-mesh wire screens spaced nine inches apart, each one over 60 feet in diameter. The picture on the front cover of this SCIENCE NEWS LETTER shows one of these eight wire screens. These eliminate nearly all the swirling or turbulence in the airstream. This 63-foot spherical bulge and its screens are just ahead of the test section of the tunnel.

Air is circulated through the tunnel by two 18-ton variable pitch co-axial fans which are powered by electric motors of 11,000 total horsepower. By means of large centrifugal compressors, air pressure within the tunnel can be varied from one-sixth to six times atmospheric pressure. The purpose of reducing the pressure below that of the atmosphere is to attain greater speed. Increasing the pressure gives the same result as using larger airplane models.

The tunnel is constructed of welded steel plate and weighs 4,000 tons. Because it is made of steel, it has to be so mounted that it can move with changes and pressure. There is only one fixed point, at the forward end of the test section. The rest of the tunnel floats on 52 pin-ended columns.

Science News Letter, July 20, 1946

American scientists in Germany are able to find no counterpart of the American produced silicones, sand-based plastics, whose products include fluids, greases, varnishes and resin as well as silicone rubbers.



WIND TUNNEL—This is an air-view of the new NACA wind tunnel showing the spherical bulge on the right.

AERONAUTICS

New Wind Tunnel

See Front Cover

➤ THE MOST modern aviation wind tunnel in the world, now completed, was dedicated on July 17 at Moffett Field, Calif. It brings to scientists the most accurate means yet achieved for studying the problems of flight up to the speed of sound.

The new unique tunnel is located at the Ames Aeronautical Laboratory of the National Advisory Committee for

Aeronautics. It is described as a low-turbulence pressure wind tunnel with a test chamber 12 feet in diameter. However, by increasing the pressure of the air inside the tunnel to as high as six times atmospheric pressure, data secured on airplane models of 10-foot span are directly applicable to full-sized planes of 60-foot span.

The most distinctive feature of the tunnel is its unparalleled smoothness of air flow. This is accomplished by a large

GENERAL SCIENCE

Science Club No. 10,000

Bloom Radio Club of Chicago Heights High School, Chicago, Ill., is the 10,000th teen-age group to become affiliated with Science Clubs of America.

► THE HONOR of being club number 10,000 affiliated with Science Clubs of America falls to a radio club in the Middle West. It is typical of the teen-age groups that make up this international science organization, the largest in the world.

Club 10,000 has been organized nine years and has 19 members. It is the Bloom Radio Club of Chicago Heights High School, Chicago, Ill.

During its lifetime, 15 boys and one girl have become licensed amateur operators. At least 75 others have done or are now doing some phase of radio or radar work in the armed services.

Service to the school is a keynote of the club. Members installed bells, an electric clock and telephone in the school's agriculture building. The club operates the school's portable public address systems, maintains the movie projectors and other visual education equipment, and cares for the school's transcription players.

The first project of the club was to build and install the centralized sound system that gives the principal instantaneous contact with all 66 classrooms. Working on Saturdays, evenings and holidays, members of the club strung out seven miles of wire and connected 84 loud speakers in this project alone.

One member operates the sound system carrying school announcements and lunch-time music; another, the portable transcription player. Four members make sure the portable amplifier is in top condition for dances, social hours and banquets; in the fall the same unit is employed to carry play-by-play accounts of home football games.

In return for such liberal services, the school furnishes the club with a room and workshop. Here members in their spare time work with the maze of receivers, transmitters, test equipment and other electronic gear. Licensed members constructed and operate the group's own

radio station, W9HFN (radio call W9YB)

The club meets twice a week after school when members are instructed in radio theory. Anything from a crystal detector to a superheterodyne is discussed, diagramed and explained.

Every noon-time is code-time in the clubroom where members practice under the experienced eye of a license-holder. Each tries to reach the goal of a minimum receiving speed of 13 words per minute necessary for a Class B amateur license.

Like all science clubs, each member has a project—in most cases working with his own radio parts. Those who

SCIENCE NEWS LETTER

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CODE PRACTICE—The club members are shown practicing code during the lunch hour in the physics room of the school.

cannot afford to buy their own are loaned one of the club's nine complete kits

Repair Family Radios

From experimenting with radio parts, the boys soon learn how to repair radios for their families and friends. This free radio repair service is also extended to the teachers.

Members keep the club solvent by selling candy and ice-cream and running various concessions around the school.

Biggest morale booster to the group

was the return of their sponsor, James F. Sears, just back from the Pacific where he was captain in the Marine Corps Reserve. Next year they will have to keep in touch with him by radio as he is going on to college teaching.

Science Clubs of America includes about 250,000 members as energetic and alert as those of club number 10,000. Sponsored by Science Service, clubs specializing in any kind of science activity can join free of charge.

Science News Letter, July 20, 1946

ECOLOGGY

Death Within Half Mile

Atomic bomb causes "lethal dose of radiological effects," evaluation report states; Bikini board urges research in interest of national safety.

► THE MOST significant point in the Joint Chiefs' evaluation board's preliminary report on the first Bikini blast is that all human beings on ships within a half to three-quarters of a mile of the explosion would have been killed as though they had been exposed to super-gigantic X-ray machine, or worse.

That is the meaning of the expression "a lethal dosage of radiological effects" to which the report says "personnel within the ships would have been exposed." This would have happened on ships so close to the atomic bomb explosion that their superstructure suffered extensive blast damage.

Men aboard an atomically bombed ship, even one that suffered a half-mile miss, would run the risk of two other atomic bomb effects:

1. Flashburn due to initial radiation from the explosion, but men within the hull or shaded from the radiation would not have been immediately affected.

2. Blast of the explosion itself, which "would no doubt have been high for those in exposed positions on vessels within one-half mile."

Add these major dangers to the gamma and perhaps other lethal radiations, and it becomes doubtful if fighting ships so attacked would have sufficient men left in action to take them to a principal naval base for the extensive repairs that the board declares would be necessary.

Naval ships of the future, in addition to having a new kind of superstructure not vulnerable to such terrific explosions, would need to have radiological protec-

tion, which is quite different from armoring against shells from 16-inch guns.

While the Bikini board urges in the interest of national safety "further large scale research and development" so that the United States can retain its present position of scientific leadership, the House rules committee heard investigation reports of the House Un-American Activities committee that viewed with alarm the fact that Oak Ridge scientists actually write to people outside the country. Another attempt to support arguments for keeping military control of atomic energy research was the charge that scientific societies within and without Oak Ridge are devoted to the creation of some form of world government.

Supporters of such ideas might view with alarm also the news that the United Nations atomic energy commission is considering establishing a scientific panel for exchanging scientific information on atomic energy.

Science News Letter, July 20, 1946

MEDICINE

Radioactive Iodine by Mouth Cures Goiter

► PATIENTS WITH one type of goiter can "very likely" be cured by swallowing one dose of radioactive iodine at a cost of about \$2.50, instead of having to undergo surgical operation as formerly, Dr. Earle M. Chapman of Massachusetts General Hospital, Boston, reported at the meeting of the American Medical Association in San Francisco.

The goiter is the kind due to overac-

tivity of the thyroid gland and is characterized by bulging eyes, rapid heart action and nervous disability.

Of 46 patients treated with radioactive iodine between May, 1943, and May, 1946, 35 responded to a single dose. Two doses were necessary in three cases and three doses in five cases. In only three cases did mild overactivity of the thyroid continue. No other treatment was given.

The radioactive iodine is a colorless, odorless liquid. That used by Dr. Chapman was produced by the cyclotron at Massachusetts Institute of Technology.

Acute reactions to large doses of the drug resemble X-ray sickness.

An idea of the "extremely large relief and rescue problem" which confronted Japanese air raid defense authorities and surviving members of the medical profession after the atomic bombing of Hiroshima and Nagasaki was emphasized by Dr. George V. LeRoy of Chicago, a member of the joint commission for the investigation of the effects of the atom bomb in Japan.

In Hiroshima, there were 80,000 killed, 40,000 injured and 85,000 in need of immediate medical care, Dr. LeRoy reported. In the Nagasaki bombing 40,000 were killed, 25,000 injured and 50,000 were in need of immediate medical care.

"It does not seem unreasonable," said Dr. LeRoy, "to believe that in the hospitals of the western world where plasma, whole blood and penicillin are available in adequate amounts, a much lower mortality rate could be achieved than was observed in Japan."

Dr. LeRoy offered these "proper objectives" in the treatment of patients who have been exposed to the amount of gamma radiation emitted by an exploding atomic bomb: maintain fluid and acid-base balance, control infectious processes, combat hemorrhagic tendency and correct the anemia.

Science News Letter, July 20, 1946

PHYSICS

Distribution of Neutrons In Atmosphere Explored

► ARMY BOMBERS have carried neutron counting apparatus as high as 45,000 feet above sea level in an exploration of the distribution of neutrons in the atmosphere. A scientific team from the Los Alamos atomic bomb laboratory, consisting of H. M. Agnew, W. C. Bright, and D. K. Froman, used a B-29 airplane in their experiments. Clouds of neutrons were discovered, and investigations are being continued.

Science News Letter, July 20, 1946

MEDICINE

Cancer of Larynx Cured

X-rays and radium treatment have cured cancer of the larynx which once depended upon surgery. This method also being used on other forms of cancer.

➤ **CANCER** of the larynx of a type for which the only hope of saving the patient formerly depended on removing the larynx, or voice box, now is being cured, in more and more cases, by X-rays or radium treatment.

Five-year cures in 18 of 47 patients, or 42%, are reported by Dr. Max Cutler, of the Chicago Tumor Institute. Three-year cures were achieved in 43, or 39%, of 118 patients. In his report to the Archives of Otolaryngology, Dr. Cutler points out that, unlike cancer of the breast or thyroid, cancer of the larynx can be considered cured if the patient remains well for three years. Most deaths from uncontrolled cancer of the larynx occur within three years of treatment.

The success in curing this kind of cancer with X-rays or radium results from a new method of using the rays from either source. "Concentration radiotherapy" is Dr. Cutler's name for the new method which is also used for treatment of similar forms of cancer. It is considered one of the most important advances in recent years in cancer treatment.

In using X-rays, a total dose of 6,000 to 6,500 r is given in 18 days to one spot, instead of the older method of giving a total of 6,000 to 7,000 r to two spots

over a period of four to seven weeks. "R" is the unit of measure for X-ray dosage.

The method of concentration radiotherapy is varied somewhat according to the location and early or late stage of the cancer. The object, however, is to give as intense radiation as possible since this seems more effective in curing radio-resistant types of cancer. The technic of treatment with radium at the Chicago Tumor Institute has been developed with the same object of giving as intensive treatment as possible.

For cancers that could be removed surgically without removing the entire larynx, or voice box, modern irradiation treatment gives as good results as surgery, Dr. Cutler reports. In more advanced cancer which would require removal of the entire larynx to save the patient, curability by irradiation is high unless the vocal cords are completely fixed. In that case, removal of the larynx is necessary.

Further improvement in the technic of irradiation and earlier diagnosis, Dr. Cutler believes, will further lessen the necessity for surgical removal of the entire larynx.

Science News Letter, July 20, 1946

AGRICULTURE

Farming Is Hazardous

➤ **FARMERS**, who are engaged in one of the most hazardous of all occupations, need to learn the facts of how, where, and why accidents happen on the farm, two Mayo Clinic physicians declared in a report to the American Medical Association. The physicians are Drs. H. Herman Young and Ralph K. Ghormley.

"In spite of medical and surgical advances that have been and are being made, one cannot help but be impressed with the almost utter hopelessness of many patients who have been injured while at work on a farm. The best cure still lies in prevention of the accidents."

Some of the facts farmers need to know, as learned from these doctors' experiences in treating injured farmers, are:

1. Falls lead all other causes of accidents and caused five deaths in every 100 accidents. Commonest type of fall is from some piece of farm equipment. Commonest injury is one or more broken bones.

2. Farm machinery comes next in number of accidents caused. In this group, the tractor, the cornpicker, the corn shredder and buzz saw, in that order, causes most accidents.

3. Livestock accounts for the third largest number of accidents. Although the bull is generally said to be the most dangerous animal on the farm, horses accounted for most of the livestock accidents in the Mayo Clinic patients.

Children are often among the accident

victims on farms. They have no more right, the Mayo doctors warned, "to be near or on a piece of operating farm equipment than around a punch press or on a moving locomotive, and yet they are permitted to be there daily."

Science News Letter, July 20, 1946

ECONOMICS

UNESCO Plans Scientific Priorities for World

➤ **RESTORATION** of scientific facilities in war-damaged countries will be recommended for priority action by the United Nations Educational, Scientific and Cultural Organization, UNESCO's preparatory commission has agreed.

Four other recommendations for priority action were: Mathematical computing laboratories, probably in Asia; assistance to international scientific unions, science cooperation offices in remote regions; and a regional research center for the Amazon area to study tropical problems and resources.

The Brazilian delegate offered the financial help of nine South American countries already supporting the Amazon project.

Science News Letter, July 20, 1946

PUBLIC HEALTH

Fire Prevention Codes Should Be More Strict

➤ **CERTAIN CHEMICALS**, explosives, dry-cleaning fluids, paints and motion picture films are included in a list of hazardous materials used in city industries given at the meeting of the National Fire Protection Association by Percy Bugbee, its general manager.

No business handling materials that are fire hazards, he asserted, should be permitted to operate in a city unless it operates under the provisions of a city fire prevention code which embodies essentials found necessary by national experience.

The codes, he said, should cover occupancies and processes such as explosives, inflammable liquids, paints, varnishes and lacquers, compressed gases, pyroxylin plastics, motion picture film, X-ray film, fireworks, garages, dry-cleaning establishments, lumber yards, refrigerator equipment, fumigation, matches and hazardous chemicals.

We feel, he continued, that the fire prevention code should include also provision for the maintenance of fire equipment in buildings, maintenance of exits

in buildings, particularly places of public assembly, and control of common fire hazards such as rubbish, bonfires, grass and brush fires, and the like.

Mr. Bugbee urged the establishment of fire prevention bureaus in all cities. The first American municipal bureau of this sort was established in New York City in 1912. All but 14 of the cities of over 100,000 population now have them, and also many smaller cities. Most of these bureaus are official arms of fire de-

partments.

War demands for men, he said, weakened both fire departments and fire prevention bureaus. "The severe and continuing rise of fire losses that we have experienced may well be traced in some part to the lessening of inspection work by fire departments, and if there was ever a time when the fire prevention bureaus in our cities should be strengthened, it is now."

Science News Letter, July 20, 1946

AUTOMOTIVE ENGINEERING

Radical Car Changes

► WHILE 1946 would-be drivers are wondering when they will be able to get their hands on a wheel again, automobile designers and engineers are talking about the car of 1950, and the new features planned.

Foreseen are supercharged engines and engines of extremely high compression ratios, and cars with independent wheel suspensions, hydraulic steering and rubber torsion springs. The occasion was the summer meeting of the Society of Automotive Engineers.

Present and prospective motor fuels, according to Earl Bartholomew of the Ethyl Corporation, offer real possibilities for high fuel economy and great power output. Gains potentially are similar, he said, whether superchargers or higher compression ratios are employed. Motor fuel octane numbers and antiknock ratings on the order of 86 premium and 80 regular grade fuels are already available. He stated that short, compact, V-type or opposed engines of 85 compression ratio operating on fuels in the 100-octane range appear to be inviting, especially by way of fuel economy, which further could be enhanced by progress in designing automatic transmissions.

A light five-passenger car is equipped with rubber torsion springs, independent wheel suspension and hydraulic steering. It was described by representatives of the B. F. Goodrich Company. The springs consist of rubber cylinders bonded internally to central shafts and externally to outer shells, either of which is held stationary and the other rotated by a wheel support arm.

Front suspension of the car is by single wheel support arms mounted diagonally from the dash on the outer member of cylindrical rubber torsion springs. Rear suspension is of the inde-

pendent swinging axle type, with a universal joint at each wheel.

Steering is accomplished by two balanced hydraulic circuits, one being a hydraulic tie rod between the front wheels, the other a pump circuit, with both kept under minimum positive pressure by a spring-loaded reservoir.

The one-ton car is the top limit in Europe for all but a wealthy few, the Society was told by Laurence Pomeroy, technical editor of a London automotive journal. Increasing attention, he said, is being given to designing a half-ton car.

The reason for this, he said, is because in the United Kingdom the most prosperous country of Europe, 78% of potential buyers must have the utmost in economy, 15% must make close studies of operating costs, and only 7% are able to buy cars on the basis of preference and performance.

As an example of European design trends, Mr. Pomeroy described a new French model, a three-wheel car with aluminum-alloy one-piece body and chassis and a 15-horsepower two-cylinder engine giving speeds of perhaps 50 miles an hour but with fuel mileage as high as 94 miles per gallon. At the other end of the scale, he said, is a German car with a six-cylinder engine giving speeds of 100 miles an hour with fuel mileage from 20 to 30 miles per gallon.

"Economic factors prescribe that normal European cars should not exceed 2,000 pounds all-up weight, and should be capable of at least 30 miles per gallon in day-to-day running," he asserted. "Improved body form will permit such cars to sustain road speeds of 70-80 miles per hour, and this will make the small economy car increasingly competitive with larger types. This competition will be fortified by world developments in mo-

tor roads which will mask the inherent limitations of the small car in the aspects of hill climbing and acceleration."

"The European car," he added, "must have material and man-hour content not greater than one-third that of American vehicles."

Science News Letter, July 20, 1946

PUBLIC HEALTH

Birth Card Adopted by Seven States, One City

► BIRTH CARDS that fit easily into a billfold are now being issued by seven states and one city. Much handier than a birth certificate, it is a combination birth registration and identification card.

The type of card varies with the issuing state. Most states use an indestructible, laminated card, thus assuring that facts will not be changed after issuance. Some include a place for the holder's photograph. On some the person's race is listed along with the date and place of birth, on others merely the father's race is given, the Census Bureau states.

Mississippi was the first state to issue birth cards to people whose birth is registered in that state. Now these handy cards are issued by six other states—California, Nevada, Ohio, Oregon, Tennessee and Washington—and one city—New Orleans.

Science News Letter, July 20, 1946

CHEMISTRY

Remove Perspiration Stain With Ammonia or Vinegar

► PERSPIRATION stains that spoil the fresh look of many summer clothes, can often be removed at home. The method you use will depend largely on how long the stain has been left in the garment.

As body perspiration is usually acid, counteract fresh stains with alkali. Dampen the spot with water and hold for a few minutes over the fumes from a bottle of ammonia water, recommend clothing specialists of the U. S. Department of Agriculture. A few drops of ammonia water diluted to half strength can be applied directly to cottons, linens and other materials that do not spot with water, if rinsed thoroughly.

Use vinegar, a mild acid, for perspiration stains that have been allowed to "set" for a few days. Sponging with vinegar sometimes restores the color, though an old stain, which may have become alkaline, is more difficult to remove than a fresh one.

Science News Letter, July 20, 1946

PHOTOGRAPHY

Special Film Used To Record Ultraviolet Rays

➤ SPECIAL photographic film with a fluorescent coating, developed by the Eastman Kodak Company, was used in a spectrograph in the nose of a giant rocket to record, a hundred or so miles above the earth's surface, ultraviolet rays radiated from the sun.

The rays to be recorded are those that never reach the earth, being unable to penetrate the earth's atmosphere. Also they are unable to penetrate the gelatin emulsion on ordinary films. The fluorescent coating used glows under ultraviolet and this glow leaves a photographic image on the film.

The rocket carrying the film and its holding apparatus were used in the Navy V-2 rocket tests at White Sands, N. Mex., in an attempt to secure new information of value to weather prediction, radio communication, stratosphere flight, and astronomy. Instruments for other purposes will be rocket-borne also.

Science News Letter, July 20, 1946

PSYCHIATRY

Too Much Security Bad for Children

➤ PARENTS should be careful not to provide too much security for their children after the early developmental age, rather, they should teach them how to live in an insecure world.

This is the opinion of Dr. Karl M. Bowman, professor of psychiatry in the University of California Medical School.

Dr. Bowman says that since there is no such thing as complete security in the world, an overemphasis on that concept is dangerous. The child should be given a feeling of security in the early developmental stage, but from then on he must be taught how to face the realities of an insecure world.

"We should aim to develop personalities capable of dealing with all situations and able to bear stress and strain, rather than to create a social organization which relieves individuals of all necessity for strength of character and feeling of responsibility," Dr. Bowman says.

"Unfortunately at the present time the idea is growing that the government is responsible for everything, and that we have no responsibility either for

our own condition or for that of our fellowmen. Such a philosophy will inevitably lead to a type of collectivism in which a limited few will dominate the behavior and thinking of the many.

"This trend is neither new nor progressive. Actually it is a regressive tendency: a return to a more primitive and archaic social organization which will inevitably lead to the same injustice, tyranny and suffering which have existed recently in Germany and Italy. In spite of this many persons of the so-called intelligentsia wish to develop this type of organization, and cannot see what the consequences will be."

Science News Letter, July 20, 1946

ENGINEERING

Lead Alloy Sheathing Improves Telephone Cables

➤ AN IMPROVED lead alloy has been developed for the familiar flexible tube that stretches from pole to pole enclosing a bunch of telephone wires and, with them, forming a telephone cable. It is an arsenical lead, containing small amounts of tin and bismuth.

The new cable sheathing, to be known as F-3 alloy, is a development of the Anaconda Wire and Cable Company. L. F. Hickernell and C. J. Snyder, of the company, told the American Institute of Electrical Engineers. It has already been installed on some commercial lines, and is suitable for underground installations as well as suspension in the air.

This new material, they said, when suitably hardened by heat treatment also has physical properties which may meet the requirements set for medium-pressure gas-filled cable. The sheathing is characterized by strong, tough welds, outstanding resistance to bending fatigue, excellent creep resistance and bursting strength.

Operating experiences have demonstrated that the attainment of good service of most electric power cables has become substantially more a function of the characteristics of the sheath than of the insulation, they explained.

A satisfactory cable, they stated, must have resistance to slow bending fatigue, resistance to creep, or expansion, at low internal pressures and to bursting due to high internal pressures, resistance to abrasion and corrosion, stability from age-hardening, and resistance to vibration fatigue caused by traffic or swinging in the wind.

Science News Letter, July 20, 1946

IN SCIENCE

NUTRITION

B Vitamin Necessary For Rat Mothers

➤ REPRODUCTION IS seriously impaired by a shortage of pantothenic acid, one of the B vitamins, animal experiments at the University of California show.

In recent experiments with rats Dr. Marjorie Nelson, research fellow, and Dr. Herbert M. Evans, director of the Institute of Experimental Biology, showed that female rats on a diet deficient in pantothenic acid always had defective litters, failed to become pregnant, or had the rat equivalent of miscarriage.

These results applied to rats fed on a deficient diet beginning as late as the day of mating with normal male rats. Care was taken that no dietary factor was deficient.

Reproduction has also been found to be impaired by deficiencies of vitamin E, vitamin A, essential fatty acids, low protein intake, riboflavin, an amino acid called tryptophane, and biotin.

Science News Letter, July 20, 1946

BIOCHEMISTRY

Quick-Drying Liquid Protects Corn Seeds

➤ A QUICK-DRYING liquid treatment to protect seed corn against disease and decay will become available commercially late this summer, the du Pont Company has announced.

A protective covering with the consistency of buttermilk is coated on the seeds by the new system called the slurry method. The covering is a water suspension of powdered "Arasan" SF fungicide, that has been successfully used on seed corn in powder form. Active ingredient in the disinfectant is tetramethyl thiuram disulfide.

Using the liquid eliminates the need for masks to protect workmen from flying dust in the powder treatment, while the corn dries quickly enough to be sacked directly from the treater.

The mechanical treater controls the flow of the fungicide, and one pound of the powdered "Arasan" in a gallon of water will coat 32 bushels of corn.

Science News Letter, July 20, 1946

E FIELDS

AGRONOMY

Fifty New Range Grasses Bred in California

➤ A VERITABLE king's banquet of new grasses is being prepared for America's range cattle by University of California College of Agriculture specialists.

Fifty new range grasses that will remain green and tender during hot summer months have already been bred with the aid of colchicine by the University's division of agronomy.

In producing the new grasses, hybrids are first created from existing species. Then these hybrids are made fertile by doubling their chromosome number through the use of colchicine.

Dr. R. M. Love, of the division of agronomy, says that the 50 new strains represent at least 20 new species. Tests show they are more vigorous than their parents and stay green better during summer months. They also survive better under dry conditions.

The scientists are now selecting the best of the 50 new grasses for vigor and fertility, and seed is being grown for large scale tests.

Science News Letter, July 20, 1946

MEDICINE

Drug Aids in Treatment Of Aphasia in Veterans

➤ A NEW TREATMENT which promises to bring recovery to many of the nation's war veterans who are disabled by brain injuries has been announced by the Office of the Surgeon General of the Army.

The patients are healthy, physically able-bodied young men but are more or less disabled because they have lost the ability to speak, or to understand what is said to them, or to read or to write. The condition is known as aphasia. It comes, in these cases, from injury to a special area of the brain. A man with this condition may be able to write what he wants to say but not to say it. He may understand what is written but cannot understand the same words when he hears them. Or he may suffer from what the Surgeon General's report terms "weird combinations" of such difficulties.

The treatment which is proving suc-

cessful, Captains Louis Lin and Martin H. Stein report, consists in first giving the patient a dose of the sleeping and relaxing medicine, sodium amytal. Under this drug's influence, emotional barriers are temporarily let down and the veteran gains confidence in himself. He is then able to profit from psychiatric treatment and careful retraining in speaking, writing or understanding words.

The patient's emotional attitude is the greatest barrier to recovery from aphasia. The Army medical officers found the patients are in a pitiable state, and feel quite hopeless about ever again being able to speak or comprehend speech. The drug gives them respite from this feeling and they can begin to learn. Even if brain areas that originally were used for speech or reading or comprehending speech are destroyed, nearby areas can be trained to take over these functions when treatment is started early.

The retraining sometimes must begin at a kindergarten or even nursery level and requires much time and patience. The outlook, however, for these patients is good in the opinion of the Army medical officers.

Science News Letter, July 20, 1946

ELECTRICITY

Fiber Glass Insulation For Magnet Coils

➤ FIBER GLASS in silicone resin makes satisfactory electrical insulation in magnet coils, it was revealed to the American Institute of Electrical Engineers by Graham Lee Moses, of Westinghouse, and Julius J. Torok of Corning Glass Works.

The insulation of magnet coils presents problems different from those of rotating machines. Messrs. Moses and Torok reported on recent tests made by them to help solve these problems.

"The combination of fiber glass and silicone resin makes an important contribution to improving the thermal life of magnet coil insulation," they said. "The end of the reliable life of such coils is believed to be determined by the failure of the silicone resins as bonds. The glass fibers provide positive turn separation and the by-products of silicone decomposition are non-conducting."

"Silicone insulated magnet coils employing fiber glass insulated wires can be rated at temperatures appreciably above the 160 degrees Centigrade temperature by resistance proposed for silicone insulation on rotating machinery."

Science News Letter, July 20, 1946

INVENTION

Classification System Needed by Patent Office

➤ WANTED: a new system of classification for scientific and technical knowledge, for use in the U. S. Patent Office.

This office frankly states it needs a new system. It is now swamped with the 8,000 applications for patents received monthly, largely because existing systems of classifying technical knowledge are hopelessly inadequate to meet modern needs.

This makes it hard on the technical men of the office who have to search through office files to determine if applications received are for inventions actually new, or if they infringe on patents already granted. It is hard also on scientists and inventors who come to the office and have to grope through masses of material to find what they want.

The American patent system is now 110 years old and has granted over 2,400,000 patents. In early days inventions were for relatively simple devices. Now they involve almost every known field of science. Some are particularly hard to classify such as those that involve electronics or the newer fields in chemistry, and they defy satisfactory classification by any known system.

The Patent Office, established for inventors and staffed by technical experts who know inventions, now wants some inventor to come forward with a new classification system.

Science News Letter, July 20, 1946

ENGINEERING

Brake Control For Automobiles

➤ AN INVENTION, relating to brakes for motor vehicles of the fluid type, provides a way by which the brakes are controlled from the starter motor and the steering wheel. A cam on the shaft of the starter motor works a piston rod for forcing fluid from a cylinder to the brakes.

A mercury switch on the steering wheel, within easy reach of the driver, is used to close a circuit to the starter motor when a braking operation is desired. The frictionally held cam will move only a limited distance before slipping, thus preventing the brakes from becoming set.

Thomas A. Martin, Jamaica, N. Y., received patent 2,403,870 for this device.

Science News Letter, July 20, 1946

ANTHROPOLOGY

A World of Masks

False faces have been used in all lands and throughout all ages. To primitive peoples they represent evil spirits, while modern masks mostly protect.

By MARTHA G. MORROW

► WE LIVE in a world of masks and most of them are not in the museum.

The conventionally pretty girl who "ohs" and "ahs" over the grotesque medicine man's mask in the show case is herself wearing a modern false face.

Her rouge, lipstick and eye shadow conceal her face and make her conform to our idealized conception of human beauty. Dr. Margaret Mead, American Museum of Natural History anthropologist, helps us see through such modern girl deceptions, which do not differ fundamentally from strange and scientifically collected false faces that attract museum crowds:

Masks with grotesquely distorted features. False faces four or five feet high. Head ornaments with towering horns

and huge flapping ears. Palm-leaf head-dresses that cover the face. Double and triple masks with hidden strings to open the outer face and show another within.

Masks such as these puzzled and intrigued GI's who, fighting in far-flung lands, stumbled upon native ceremonials or discovered them hanging unused in tiny villages.

Then there is the bandit's handkerchief of blood and thunder wild west stories. Surplus gas masks are sold as Christmas toys. Skilled surgeons operate behind spotless face coverings. Welders seek the safety of helmets in rushing ships to completion.

Today's Masks Protect

Today masks are used primarily to protect the wearer against flying sparks or possible infection. Physical protection,

however, is one of the least important qualities of the magical false-face. As in pagan lands, occasionally masks dramatize the hopes and fears of our own children. Santa Claus with his rosy cheeks and long white beard still promises gifts. Witches and ghosts even today stalk the byways at Hallowe'en.

Used to disguise or protect, masks are found all over the world. Sometimes they help man imitate some spirit which he fears and hopes to control. Often an animal disguise aids in making an early kill. At other times they are used merely for dramatic effect—to give the actor added height, or make him extremely handsome or grotesque.

In primitive lands masks are still worn for ceremonial dances. Almost all the Negro peoples of Africa use false faces for worship and driving out evil spirits, for secret-society activities, and for festivals. They are made along the equatorial belt from Senegal to the Sudan, Gold Coast, Congo and Tanganyika.

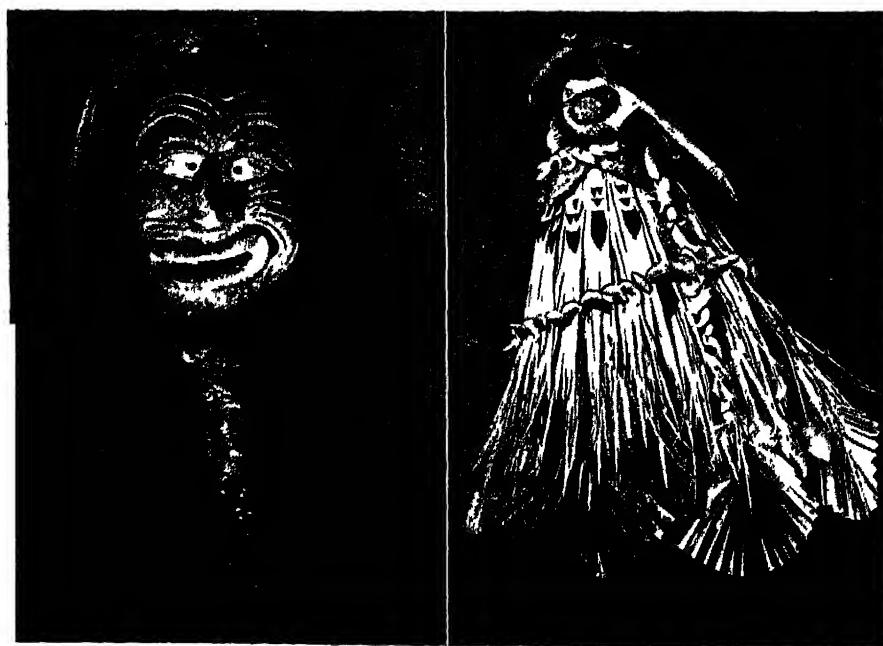
Disguised with a mask, the wearer moves as he feels the mask-spirit would move. If he wears an animal head, he imitates the characteristic movement of the animal. The goat, for instance, wags its beard and leaps. The bull menaces with its horns and charges. These movements, repeated over and over again, give birth to the rythmical dances performed by the wearer, reasons Dr. Paul McPhalin of the Cranbrook Institute of Science, Bloomfield Hills, Mich.

All Types Material Used

Everything from wood, reed, fabric, shells, to fur and metal are used in making masks. Wood, one of the best materials, has been used in all parts of the world. Frequently the mask is hewed from a living tree, to catch the spirit of the tree.

False faces may be small, covering only a portion of the wearer's face. Or they may cover the face and top or all of the head. Tall ones, adding many inches to the wearer's height, are worn like a helmet with the visor down the neck of the mask fitting around the head of the wearer.

Hidden strings in masks found along the Northwest Coast bring the natives of Haida, Tlingit and Salish face-to-face with their spirit ancestors. By pulling the strings to open and close the double



FALSE FACES—At left is a closeup of a grotesque wooden mask, trimmed with horsehair, worn by the Iroquois False Face Society dancer. Such masks are carved on the trunks of living trees. At right is a New Guinea ballet dress of palm leaves and festoons of bright orange gourds with a mask woven of fiber and a long nose, representing the Sepik natives' idea of beauty. These masks are now on exhibit at the American Museum of Natural History.

and triple masks, dancers portray their animal ancestors who could change to human form and back again.

The Eskimo hopes to attain power over the natural world by wearing a spirit mask. They have the shape of a human face, but one or more features are distorted to resemble a bird, fox, wolf or seal. Feathers and fur attached to the edge of the masks move back and forth with the motion of the dancer.

A surprise awaits those who see masks from Guatemala for the first time. Instead of representing natives of Central America, they portray blond Spaniards with their blue eyes, pink cheeks and curly hair. These are used in pageants depicting the Conquest of Mexico, and battles between Moors and Christians.

Beautifully carved masks made by the Ibos of the Niger river include a long, straight nose, thin lips and small teeth. Remarkably Egyptian in character, these are the Maw masks, painted in white to represent the primitive conception of the resurrection in reembodying spirits.

Peace with spirits of the other world is the chief aim of the masked dancers in Borneo. Of weird design and elaborately carved, they are worn to insure

good harvest by capturing the timid Rice Soul at planting time.

Iroquois Dances

False faces are worn right here in the United States, not only by the Hopis and Papagos of the Southwest, but also by Iroquois in New York state. Dancers of the Onondaga tribe suddenly appear outside the council house wearing grotesquely twisted faces. Pounding with their clubs and shaking their turtle-shell rattles, they rush into the house. Creeping and crawling on all fours, they shake their rattles along the floor. The Iroquois False Face Society dance is performed today, as it was when white men first appeared on these shores, to appease the devils and drive out the witches who bring disease and misfortune.

Recalling legends and superstitions of long ago, masks such as these are being exhibited at the American Museum of Natural History throughout the summer. Iroquois husk faces that look like door mats with holes for eyes and mouth are displayed along with gaudily colored Devil-dancing masks from Ceylon. As unrelated as they may seem, they were all used to mystify the audience.

Science News Letter, July 20, 1946



TODAY'S MASK—Most of the masks of today, at least those of civilized people, are used for protection. The man in the picture is welding iron beams on a construction job. The mask is his protection against flying sparks.

MEDICINE

Hemorrhage Preventives

Tubes of fibrin from blood will save children threatened by hemorrhage; new types of gauze and sponges avert bleeding in operations.

➤ **TUBES MADE** of fibrin from blood are expected to help doctors save children threatened by death from hemorrhage due to cirrhosis of the liver, it was revealed at the meeting of the American Medical Association in San Francisco. In such cases, doctors try to overcome the danger of bleeding to death by operations to shunt the blood circulation from one vein to another. The fibrin tubes are expected to help by holding the cut ends of the blood vessels together without the need for stitches which may cause blood clots. Experimental work which has convinced the investigators the tubes are ready for use was reported by Dr. Orvar Swenson of Children's Hospital, Boston.

Danger of fatal hemorrhage in operations or accidental injuries may be averted by two kinds of sponges shown at the exhibits. One of these is made from oxidized cellulose. Dr. Virginia Kneeland Frantz, of Columbia University, dropped

a bit of the gauze into a glass containing soda bicarbonate solution having the same alkalinity as the blood.

The gauze, unlike ordinary surgical gauze, immediately started dissolving, showing how it can safely be left in the body eventually to be absorbed.

Next Dr. Frantz dipped the oxidized gauze and ordinary gauze into blood. The oxidized gauze at once became a sticky, thick mass that would stop further bleeding, while the ordinary gauze became a soggy mass as it soaked up blood. When used on open wounds where the surgeon fears infection, the oxidized gauze can be removed without starting fresh bleeding because it gets jelly-like and comes off without trouble.

The other anti-hemorrhage aid to surgeons and first aiders is a gelatin sponge. When blood enters the sponge a reinforced blood clot is formed. If it is

pressed over the bleeding point it sticks there until fibrin is liberated from the blood to hold the sponge clot in place. Like the oxidized cellulose gauze, this gelatin sponge can be left in the body and finally will be absorbed after bleeding has stopped. This development was reported by Drs. Hilger Perry Jenkins, Rudolph Janda, James Clarke, Edward H. Senz and Howard W. Owen of the University of Chicago department of surgery.

The gelatin sponge has formed a reinforced clot firm enough to stop bleeding from wounds of the heart, but Dr. Jenkins believes it is only a first step toward better aids for controlling bleeding. It is not a substitute for stitching a cut blood vessel nor for tying it to prevent bleeding, but is for use when these methods would fail.

Safer operations with less blood loss and possible development of operations that cannot be performed today because of the danger of hemorrhage are foreseen by Dr. Jenkins as a result of future developments of the gelatin sponge or the oxidized gauze.

Both are so new that neither Dr. Jenkins nor Dr. Frantz can say in what conditions one might prove better than the other. Both doctors are equally enthusiastic about both developments.

Science News Letter, July 20, 1946

Do You Know?

Live *tumber* is seldom static; it is either growing in size or declining in net usable volume.

Roses need fertilizer only once in a year, but they need plenty of water during the hot days of late summer.

Welding is increasingly replacing rivet joints in the construction of all classes of metal railroad cars.

Fungi have long been used by man for useful purposes such as in yeast to leaven bread and ferment wine, and molds to give flavor to cheese.

About 31,000 miles of mainline railroad tracks now have rails weighing 130 pounds per yard; the heaviest rails used 50 years ago weighed 80 pounds per yard.

British scientists report that by a suitable treatment of common seaweeds *Gigartina stellata* and *Chondrus crispus*, known collectively as Irish moss, an agar can be produced similar to the true agars formerly obtained from Japan.

The shy *wood ibis* of the southern coast of the United States, a distant relative of the European stork, is the only member of the stork family in this country.

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ASTRONOMY

Brilliant October Meteors

The Giacobini-Zinner comet, recently rediscovered, is expected to provide meteoric fireworks in October when the earth nears its path.

➤ THOUSANDS UPON thousands of "shooting stars" will flash on an October morning this fall, bringing one of the world's most brilliant meteoric showers, if present expectations of astronomers are fulfilled.

The earth plowing through debris from a comet will be the cause of this expected meteor shower scheduled for the early morning hours of October 9.

The earth comes within 135,000 miles of the path of Giacobini-Zinner comet at that time. The earth arrives that close to the comet's path at a point where the comet passed by only eight days earlier.

In 1933 one of the most remarkable of meteor showers startled the world. It made first page news when reported from Europe. Each minute for many hours as many as 400 meteors a minute were actually counted. This brilliant and historic display was caused by the same comet, now rediscovered. But in 1933 the earth was about 500,000 miles from the comet's orbit, over three times as distant as the 1946 prediction, and the comet had preceded the earth by 80 days, not eight days. For this reason, the 1946 display may be even more remarkable than the 1933 Giacobini shower.

The Giacobini-Zinner comet was rediscovered on May 29 by Dr. Hamilton M. Jeffers of Lick Observatory, Calif., and this sets the astronomical stage for the possibility of "fireworks" next fall. The comet itself is quite remarkable to view now or later. At present it is far too faint to be seen with the unaided eyes or even through binoculars.

Discovered in 1900 and having a period of a little over six years, it is only when the comet returns to the vicinity of the earth so that its path comes close to the earth, as in 1933 and this year, that it has the chance to cause a spectacular meteor shower.

Astronomers are reluctant to make too positive predictions. Dr. Fred L. Whipple of Harvard Observatory, a world authority on meteors, cautions: "No certain predictions can be made concerning the magnitude of any meteor shower." He recalls the vast expectations built up

that there would be a great shower of Leonid meteors in 1899, whereas this event disappointed both astronomers and the public. But Dr. Whipple does feel that next October "the circumstances are extremely favorable."

Science News Letter, July 20, 1946

NARCOTICS

Strong Warning Issued Against Use of Demerol

➤ A STRONG warning against Demerol, pain-killing drug recently hailed in a popular article as "God's Own Medicine," is issued by Federal Commissioner of Narcotics H. J. Anslinger in the *Journal of the American Medical Association*, (July 13).

Demerol has addiction, or habit-forming, properties similar to morphine, in spite of popular reports to the contrary, Mr. Anslinger states.

"I cannot too strongly warn the members of your Association about the danger of addiction to Demerol," he declares.

Demerol's addiction properties were shown in studies by Dr. C. K. Himmelsbach of the U. S. Public Health Service at the Federal health service's hospital at Lexington, Ky. In addition, Mr. Anslinger points out, Drs. Hans H. Hecht, Paul H. Noth and F. F. Yonkman, of Detroit, also warned of the danger of Demerol addiction.

"Demerol was placed under federal narcotic control by the Congress because of evidence given before that body of dangerous properties," Mr. Anslinger says.

Numerous cases of addiction involving the use of Demerol are in the files of the Bureau of Narcotics, and Mr. Anslinger fears "a wave of Demerol addiction" if physicians believe what he considers "reckless and dangerous statements" recently made.

Demerol was discovered in Germany and made its appearance in Argentina several years ago. Both countries immediately placed it under strict control.

Science News Letter, July 20, 1946

There is no ready way to distinguish between edible and other mushrooms.



Unjustly Accused

➤ **GOLDENROD** is in bloom again, and sneezes ring from noses tormented with irritating pollen. So thousands of sufferers see cause where there is only coincidence, and the goldenrod gets the blame.

What actually happens is that the two commonest species of ragweed come into bloom at just about the same time as goldenrod. Their flowers are green and inconspicuous, though they shed thousands of times more pollen than does goldenrod. Hay-fever sufferers, glaring about with red and watery eyes, ignore the camouflaged trouble-causers and fix upon the masses of bright blossoms. Goldenrod pays an unfair price for its

conspicuous beauty.

But, some will argue, a bunch of goldenrod was brought into the house yesterday, and I started sneezing almost immediately. True enough. The sneezes could have come from one of three causes. They could have been purely psychological: we have a tendency to do the thing we are afraid will happen. The goldenrod's own pollen might possibly be responsible: allergists say that a very few persons do react to goldenrod, though they are counted as single individuals to the thousands who are sensitive to ragweed. Likeliest way for goldenrod to cause sneezes is as a passive carrier for ragweed pollen, that has settled like dust on its flower-heads and leaves, and gets shaken off again when the stalks are picked and carried away.

Best thing to do, if you think goldenrod makes you sneeze, is go to an allergist and get yourself tested with all the pollen extracts in his armory. That will settle the question of guilt or innocence with reasonable conclusiveness.

The chances are always against goldenrod's being responsible. Its pollen appears to be inherently less likely to cause an allergy than is the pollen of the ragweeds. Not only that; it is far less likely to be adrift in the air, for it is the large-grained, heavy, sticky kind of pollen that is adapted for insect carriage, as contrasted to the light, dry, powdery pollen of the ragweeds, which is adapted for floating on the lightest hint of a breeze.

Science News Letter, July 20, 1946

1. The biting dog should be immediately taken to a veterinarian or the local health department so that he can be put under observation to learn whether he has rabies; 2. The person who was bitten should see a doctor at once. If the bite victim was another dog, this animal should also be taken to the veterinarian for confinement and observation so that he cannot spread the disease if he has caught it.

Science News Letter, July 20, 1946

AGRICULTURE

Making Hay While The Sun Isn't Shining

➤ **MAKING HAY** while the sun doesn't shine seems to be the motto of a Pennsylvania farmer whose hay curing process has been reported to the American Society of Agricultural Engineers by R. C. Miller of Ohio State University.

The farmer, Herbert Muffley, near Easton, Pa., used a large fan, an automobile engine and an improvised wind tunnel to dry hay in his barn after having baled it in the field. With this make-shift equipment he made hay that sold for \$60 per ton as opposed to \$45 a ton for his best field-cured hay.

Barn curing with a small power unit is generally used for loose, long hay but Mr. Muffley increased his returns by using 28 to 48 horsepower from an automobile engine in an old-fashioned overhanging Dutch barn with a lean-to shed.

Science News Letter, July 20, 1946

PUBLIC HEALTH

Vaccinate Against Rabies

➤ **NOW THAT** the "dog days" are here, they may spur communities to intensify the fight against rabies. Traditionally, this is the season when the disease is more prevalent in dogs and humans. U. S. Department of Agriculture scientists explain this may be because people and animals move about more freely. Actually, the hot weather does not have any effect on the disease itself and the term "dog days" is said by these scientists to be just one of several myths associated with rabies.

The word "hydrophobia," sometimes used as a name for the disease, is another myth, the Agriculture scientists point out. The word means fear of water, but rabid, or mad, dogs do not show any such fear. Even foaming at the mouth is not a reliable sign of the disease.

The first sign of rabies in a dog is a change in his disposition. He seems to lose his normal desire to recognize and be friendly with other dogs and people. Dogs which have previously been somewhat aloof may, on the other hand, become unusually affectionate, friendly and gentle. The vicious, aimless snapping and crazy running about come later.

Vaccination of dogs to protect them against this disease is advised by the U. S. Bureau of Animal Industry. Other measures to prevent spread of the disease are prompt segregation of any dog suspected of being rabid, prompt examination of the brain of any suspect dog, quarantines and impounding all strays.

When a rabid dog or one suspected of having rabies bites a person or another dog, two things should be done at once:



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PHYSICS

Speeding Up the Proton

➤ SCIENTISTS IN the front lines of physical exploration of atomic particles are excited about a new kind of high voltage machine that promises to speed along the hearts of atoms at accelerations of several hundred million or even billions of volts, comparable to or exceeding the cosmic rays from outer space.

The linear accelerator, as it is called, was talked about for the first time at the Berkley, Calif., meeting of the American Physical Society by Prof. Luis W. Alvarez of the University of California.

Using the resonating cavities from second-hand radar sets left over from the war, it is understood that an accelerator about 40 feet long that will operate at about five million volts direct current is being built and should have its first trials next fall. It would be used to accelerate hydrogen atom hearts, protons, useful in all sorts of atomic or nuclear research such as produced the atomic bomb.

Eventually the resonating units, each giving a kick to the particles, might be strung out for a mile or more in a

straight line. This would give accelerations equivalent to hundreds of millions or even billions of volts, if all goes well.

Work on the linear accelerator "atom-smasher" was begun when it appeared that the cyclotron had reached a limit in its voltage at about fifty million. This was before a frequency modulation scheme was used a few months ago with the cyclotron that now makes it possible to operate it at several hundred million volts. A new giant 184-inch cyclotron is being built at the University of California, under Nobelist Ernest O. Lawrence.

Another atom-smasher, the synchrotron which has unusual qualities all its own, is being developed by Prof. Edwin M. McMillan. It will develop 300 million electron volts. With the giant cyclotron it makes a pair of the most powerful instruments for atomic bombardment in the world.

With this new array of atomic artillery many new discoveries about the constitution of matter and the action of atomic particles may be expected in forthcoming months.

Science News Letter, July 20, 1946

ENGINEERING

New Vacuum Tube Amplifier Speeds Messages

➤ A HUNDRED million words a minute by telegraph, 10,000 cross-country telephone conversations at the same time, dozens of simultaneous television programs—these are the predicted possibilities of a new vacuum tube amplifier.

It is a product of the Bell Telephone Laboratories and will be known as the traveling wave tube. It is entirely different in appearances from previous type amplifiers. It has a stem over a foot long, and a cylindrical bulb at one end.

Inside the stem, running from one end to the other, is a coil of thin wire. The wave to be amplified is fed onto the coil at the bulb end through a wave-guide and is drawn off at the other end in the same way.

While the waves travel down the coiled wire, a beam of electrons is shot through the inside of the coil traveling faster than the wave. These electrons tend to slow down and give up some of their energy to the wave. As a result the wave gains a tremendous amount of

energy and becomes amplified many times.

The idea underlying the tube was proposed and was worked on during the war by a British scientist, R. Kompfner of Oxford University's Clarendon Laboratories. Dr. John R. Pierce of the Bell Telephone Laboratories, with Dr. L. M. Field, solved the electronic problems of the new tube and overcame effects which rendered earlier efforts of little practical value. F. H. Best handled mechanical design and construction problems.

Science News Letter, July 20, 1946

MEDICINE

Dengue Fever Differs From Colorado Tick Fever

➤ DENGUE FEVER and Colorado tick fever, which are strikingly similar in their effect on human victims, are separate diseases, it is revealed in experiments at the University of California Medical School.

In tests with human subjects, it was found that the contraction of one of the diseases does not give immunity to the other. Therefore, it is concluded that they are separate diseases.

The similarity of the two diseases was brought to light during the war, when American fighting men in the Pacific were plagued with dengue, which has almost the same symptoms as tick fever already known to American doctors.

The research was done by Dr. W. McD. Hammon, associate professor of epidemiology in the Hooper Foundation, and Dr. Lloyd Florio, of the University of Colorado Medical School.

Science News Letter, July 20, 1946

ORNITHOLOGY

Laysan Island Rail Now Extinct

➤ ADD TO THE war's casualty lists a species of small wading birds that has gone the way of the famous but long-departed dodo.

Wartime conditions rather than actual gunfire wiped out a species of rail, found only on Laysan and Midway Islands in the Pacific, Dr. Dillon Ripley of the Peabody Museum of Natural History has announced.

Rats, spreading rapidly due to war conditions, killed off the last of this species of the smallish stilt-legged wading birds that are related to snipes and sandpipers, Dr. Ripley reported.

Science News Letter, July 20, 1946



100,000,000 WORDS A MINUTE—
This new and simple vacuum tube amplifier developed by Dr. John R. Pierce of Bell Telephone Laboratories (holding the tube) may have far-reaching significance in long-distance telephone and telegraph transmission.

• Books of the Week •

DESCRIPTIONS OF TWO NEW LEAFBIRDS FROM SIAM—H. G. Deignan—*Smithsonian Institution*, 3 p., paper, 5 cents. Smithsonian Miscellaneous Collections, Vol. 106, No. 12.

ECONOMIC RESEARCH AND THE KEYNESIAN THINKING OF OUR TIMES—Arthur F. Burns—*National Bureau of Economic Research*, 69 p., tables, paper, free. The 26th annual report of the National Bureau of Economic Research, Inc., including an account of activities in 1945 and some plans for the future.

ECONOMIC STAGNATION OR PROGRESS—Ernst W. Swanson and Emerson P. Schmidt—*McGraw*, 212 p., \$2.50. A critique of the Keynes-Hansen school of economic stabilization.

THE ENDEAVOR OF JEAN FERNEL: With a List of the Editions of his Writings—Sir Charles Sherrington—*Cambridge Univ. Press*, 223 p., illus., \$3.50. A study of the life, personality, and work of Fernel who was a sixteenth century French physician.

EXPERIMENTAL HYPERTENSION—Roy Waldo Miner, Ed.—*N. Y. Acad. of Sciences*, 179 p., tables and diagrs., \$3.75. A series of papers on arterial hypertension, the results of a conference held by the Section of Biology of the N. Y. Acad. of Sciences Feb. 9 and 10, 1945, in New York City. Special Publications of the N. Y. Acad. of Sciences, Vol. III.

FORECASTING COLLEGE ACHIEVEMENT: A Survey of Aptitude Tests for Higher Education, Part I—Albert B. Crawford and Paul S. Burnham—*Yale Univ. Press*, 291 p., tables and diagrs., \$3.75. The first of a three volume series representing a comprehensive statement of general principles in measurement and guidance at the college-preparatory and freshman levels.

METEOROLOGY. With Marine Applications—William L. Donn—*McGraw*, 465 p., tables and illus., \$4.50. A textbook for marine deck officers which will also serve as a general introduction to the study of meteorology, including ground work in the observation and theory of the weather elements and an extended treatment of the hurricane, with attention to modern concepts of air masses and fronts.

MUST DESTRUCTION BE OUR DESTINY? A Scientist Speaks as a Citizen—Harrison Brown—*Simon and Schuster*, 158 p., \$2. What the destruction of Hiroshima and Nagasaki means, and an examination one by one of the problems and the possible solutions raised by the awful accomplishments of our new weapon, the atomic bomb.

THE NATIVE TREES OF FLORIDA—Erdman West and Lillian E. Arnold—*Univ. of Florida Press*, 212 p., illus., paper, \$3; cloth, \$3.75. Descriptions of bark, twigs, flowers, fruits, etc., together with general comments on the trees which are native to Florida.

NOTES ON THE HERPETOLOGY OF THE PEARL ISLANDS, PANAMA—Doris M.

Cochran—*Smithsonian Institution*, tables, 8 p., paper, 5 cents. Smithsonian Miscellaneous Collections, Vol. 106, No. 4.

PHYSICS—Walter G. Whitman and A. P. Peck—*American Book Co.*, 629 p., illus., \$3. A textbook for use in the high schools, emphasizing practical applications of physics and providing the foundation for an extremely flexible course.

PHYSICS AND EXPERIENCE—Bertrand Russell—*Cambridge Univ. Press*, 26 p., paper, 50 cents. The Henry Sidgwick lecture delivered at Newnham College, Cambridge, 10 Nov., 1945. An examination of the problem of knowledge in the physical sciences.

PIEZOELECTRICITY. An Introduction to the Theory and Applications of Electromechanical Phenomena in Crystals—Walter Guyton Cady—*McGraw*, 806 p., tables and diagrs., \$9. International Series in Pure and Applied Physics.

PROTECTIVE AND DECORATIVE COATINGS Vol. 5—Joseph J. Mattiello, Ed.—*Wiley*, 662 p., tables and illus., \$7. Analysis and testing methods, including analysis of resins and drying oils, testing of metal finishes, spectral characteristics of pigments and resinography.

REVIEW OF THE NEW WORLD SPECIES OF HIPPODAMIA DEJEAN (COLEOPTERA COCCINELLIDAE)—Edward A. Chapin—*Smithsonian Institution*, 60 p., diagrs., paper, 35 cents. Smithsonian Miscellaneous Collections, Vol. 106, No. 11.

THE VETERAN AND HIGHER EDUCATION: A Report to the President by the Director of War Mobilization and Reconversion—*Government Printing Office*, 39 p., tables, paper, 10 cents. An examination of the problems involved in the rapid expansion of our education facilities to permit the accommodation of those veterans and other students who will wish to go to school next fall.

WATER TREATMENT AND PURIFICATION—William J. Ryan—*McGraw*, 270 p., tables and illus., \$2.75, 2nd ed. Description of the design and operation of sedimentation tanks, coagulation basins, chemical feeding devices, filtration plants, softening apparatus, etc. This second edition includes latest methods for preventing boiler embrittlement, equipment for speeding up the lime-soda softening process, etc.

WOMEN IN INDUSTRY. Their Health and Efficiency—Anna M. Baetjer—*Saunders*, 344 p., tables, \$4. An attempt to make available valuable information for the proper placement of women in industry and to present facts about the relationship of employment to the health of women.

Science News Letter, July 20, 1946

Matches and smoking caused nearly 30 per cent of all fires in claims reported to the National Board of Fire Underwriters in the ten-year period that ended Jan. 1, 1945.

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Science News Letter, July 20, 1946

☼ **MOISTURE METER**, developed in England to help farmers measure the percentage of moisture in grain, is an electric condenser between the two plates of which a weighed quantity of grain is placed. Its dielectric constant is affected by the humidity of the grain; the percentage is indicated on a scale.

Science News Letter, July 20, 1946

☼ **LEAKPROOF BATTERY** for flashlights is enclosed in a seamless plastic cylinder and can be immersed in water for months without deterioration or diminishing the strength of the charge. Claimed to give exceptionally long service, when finally exhausted the battery contracts in size, making removal easy.

Science News Letter, July 20, 1946

☼ **UNDERCARRIAGE unit** for light airplanes includes in one package landing gear, tire, wheel and brake. Its shock absorption unit is a spring-like rubber cylinder, filled with compressed air, which cushions the initial impact of landing; rings of friction-material restrict bouncing tendencies.

Science News Letter, July 20, 1946



☼ **RESPIRATORY device** for persons in dangerous atmospheres generates its own oxygen and makes the wearer independent of hose connection to distant cylinders of high-pressure oxygen. The device, shown in the picture, contains a chemical that reacts with moisture in the wearer's breath, releasing oxygen.

Science News Letter, July 20, 1946

☼ **LOCATOR buoy**, tossed into the ocean by downed Army airmen on a life raft, shoots up an antenna and sends out radio signals that can be picked up by planes anywhere within 50 miles. Its heart is a special sea-water battery, acti-

vated by water entering through a hole in its jacket.

Science News Letter, July 20, 1946

☼ **GASOLINE purifier**, for use on aircraft, automotive and stationary engines, cleans the fuel by passing it between layers of helically wound ribbons made from impervious material. Dirt and other impurities stop at the outer edges of the ribbons, and fall into a sediment chamber.

Science News Letter, July 20, 1946

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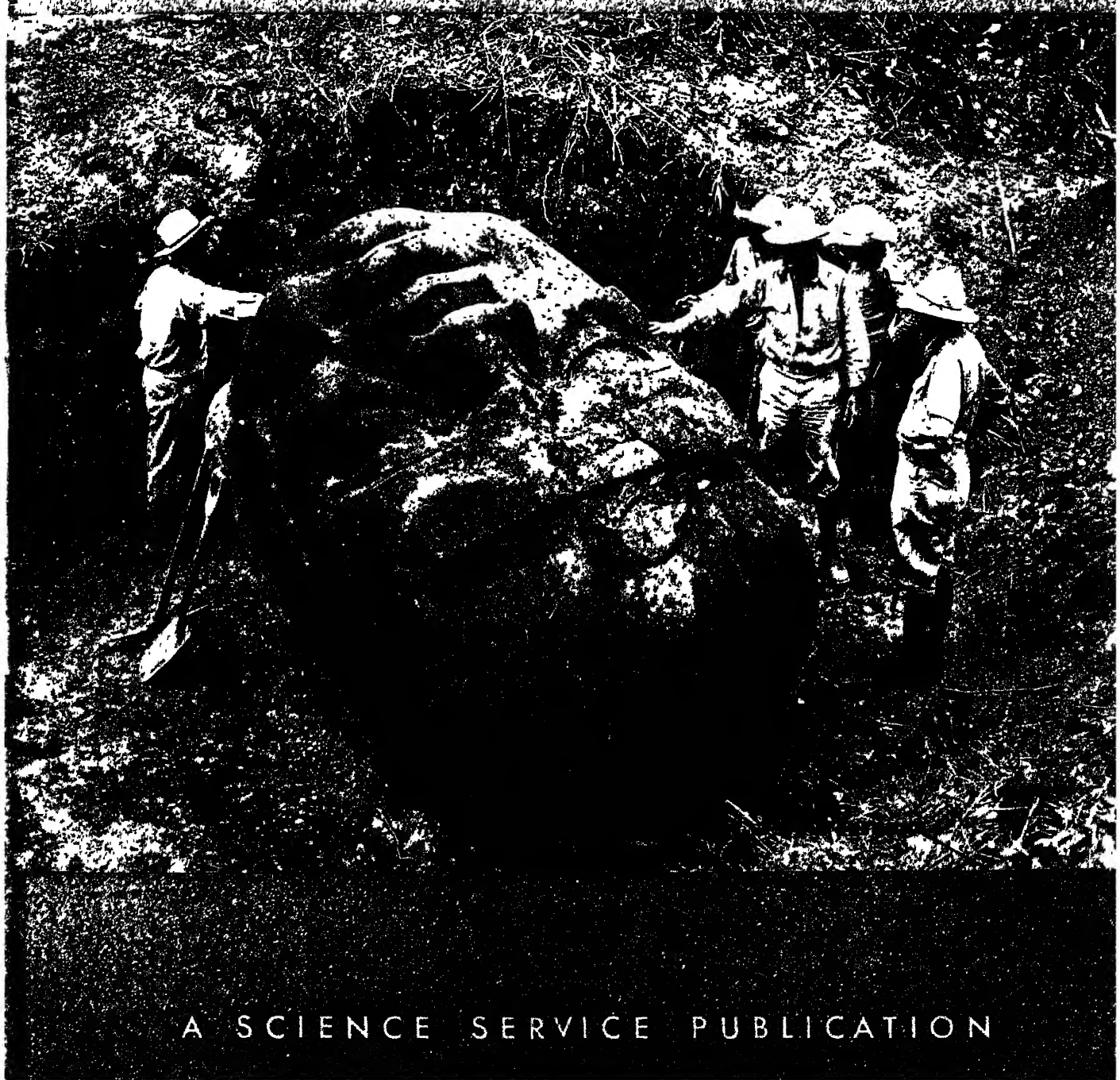
13 MAR 1952

SCIENCE NEWS LETTER



Vol. 51, No. 1

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JULY 27, 1945



A SCIENCE SERVICE PUBLICATION



The why of Monsanto Calcium Phosphates

Modern diets—even though rich in vitamins—often do not provide all the calcium and phosphate the body normally needs.

To guard against this possible dietary deficiency, many manufacturers add Monsanto calcium phosphates to flours, breads, cereal foods, salt, and even sugar. This supplies a reserve the body needs, regardless of age or sex. For, calcium phosphate is the principal element the body uses to build bone and tooth structure during infancy and childhood. Also, it is essential throughout adult life, if bones, teeth and tissue are to remain strong and healthy.

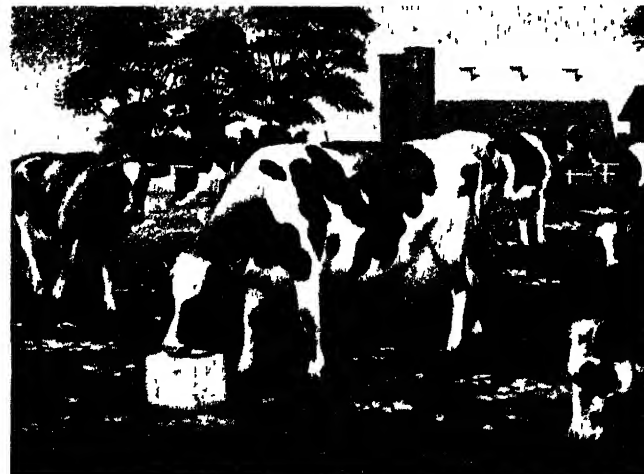
Here is just another of the many ways Monsanto benefits everyone, every day—this time through the chemistry of health and life itself.

MONSANTO CHEMICAL COMPANY, ST. LOUIS 4

District Offices: Akron, Birmingham, Boston, Charlotte, Chicago, Cincinnati, Dayton, Detroit, Los Angeles, Montreal, New York, San Francisco, Seattle, Springfield, Toronto.



Monsanto's elemental phosphorous, of better than 99.9% purity, is the source of Monsanto's calcium phosphates. These phosphates are pure white, tasteless, odorless.



Animals instinctively choose foods rich in calcium phosphates. That's why livestock thrives when supplied with "salt blocks" fortified with Monsanto calcium phosphate.

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|---|
| CALCIUM PHOSPHATE, MONO |
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What's YOUR Problem?

If you manufacture food products or medicinals that can be profitably enriched with calcium phosphates, contact Monsanto... Or, if you have any problem beyond the field of foods, you may find an answer in Monsanto's many hundreds of chemicals and plastics.

ATOMIC ENERGY

Control Fear, Not Fission

Attitudes of people, not control of fissionable materials, are the real problem, atomic energy meeting is told. UNO must stop world's rush for uranium.

➤ IF IT HAS not become apparent as a result of the sessions of the UNO atomic energy commission in New York, the nonofficial and more outspoken atomic energy meeting in Washington has made this clear:

The real problem is not the control of the fission of the plutonium atom, but the control of the attitudes, feelings and emotions of peoples of various nations.

Secretary of Commerce Henry A. Wallace put it this way:

"The immediate purpose of any plan for control of atomic energy is to put an end to the possibility of a state of international hysteria and fear in which other negotiations will become so difficult as to be impossible."

The immediate purpose in Secretary Wallace's view is not to solve the whole problem of war but to avoid the possibility of a surprise war which could kill millions of persons in a night.

Those who continue to prepare for total war in an atomic world in the belief that this is the best security for peace were told by Dr. Norman H. Dawes of Carnegie Institute of Technology that all those who have so believed and acted have shortly found themselves in armed conflict.

"There is an alarming loss of faith for democratic living," he warned the Institute on World Control of Atomic Energy, "and the resultant mental and spiritual climate is not at all assuring to men of good will."

Hungry, desperate, undernourished human beings will fail to comprehend the issues at stake or take those measures for the control of atomic power in which alone there is world security, Dr. Dawes declared.

The power of the nucleus must be used, Dr. Philip Morrison, atomic physicist of Los Alamos, New Mexico, and Cornell University, declared, "to change not only the forces with which we deal but the relations among men themselves."

Secretary Wallace told the institute that "the people cry for new and revolutionary measures to control new and revolutionary dangers," and that "there has been criticism of statesmen and dip-

lomats for being too slow in buckling down to real work on these problems."

There is no doubt, Secretary Wallace continued, that there will be eventual revolutions in our industrial life. But he urged that we must not take a whole generation to realize and act upon the implications of this new age. Because, as he put it, "we simply cannot afford to waste that much time."

A world search for uranium is being carried out on a scale surpassing that of the gold rush of '49.

An international rush for the raw material for atomic bombs and atomic energy is underway even though it is hidden from view, W. A. Higinbotham, chairman of the Federation of American Scientists, told the atomic energy institute.

The UNO atomic energy commission must stop this atomic arms race before it can go about solving other major problems, Mr. Higinbotham warned.

It political and technical controls against the nations of the world making bombs is not achieved, we must to a

large extent give up our cities, he declared.

The official U. S. Strategic Bombing Survey issued by the White House and buried under OPA and Bikini news, Mr. Higinbotham said, pictured the nation "running for cover and burrowing like moles so fantastically as to seem almost unbelievable."

Already, Mr. Higinbotham said, nervous people are going to fortune tellers to ask where they will be safe, economic advisers are recommending rural property as safe investments, and bills in Congress to replace the government if destroyed overnight receive serious consideration.

Expressing confidence that people all over the world will support the U. S. proposals for international control if they get the facts, Mr. Higinbotham also said that the attitude of humanity toward war should change because of the atomic bomb menace.

The House Talks on Control

➤ THE McMAHON bill for the control of atomic energy (Sen. 1717) was the principal subject of debate in the House of Representatives last week. Opponents of the bill attempted (1) to kill it outright, (2) to delay matters indefinitely, leaving atomic energy control in the hands of the Army, and (3) to have the bill returned to (Turn to Page 53)



NEW RECORD—This AAF R-5 Sikorsky helicopter is holder of the new world's record for long distance flight set at Air Materiel Command, Wright Field, Ohio. It was flown from Wright Field to Boston.

ARCHAEOLOGY

Excavations In Mexico

Enormous stone heads and monuments of mysterious origin discovered. The basalt from which they were made is not native to the section.

See Front Cover

► FIVE COLOSSAL stone heads, one frowning and the others placidly viewing the world, have been brought to light in the jungles of southern Mexico.

These newly-discovered great stone heads were found among the remains of a prehistoric Indian ceremonial center excavated this spring by an expedition of the National Geographic Society and the Smithsonian Institution.

"These gigantic heads represent the best group of monuments we have ever found," Dr. Matthew W. Stirling of the Smithsonian Institution, expedition leader, stated upon his return. Although similar to other basalt heads found by the expedition in previous seasons, these found in the archaeological site known as San Lorenzo are better preserved and have finer carvings.

The picture on the front cover of this SCIENCE NEWS LETTER from the National Geographic Society, shows the first colossal head taken out by the expedition. It is classed as a number one head and is one of the two largest, measuring nine feet in length. This head is one of the best made and best preserved of the La Venta type. Dr. Stirling and Dr. Drucker are standing beside the head.

Word that a colossal stone head was in this region reached the expedition at work in Chiapas, through friendly natives. A comparatively new village had grown up in the section, and in cutting a trail, the natives stumbled across a fallen head six to eight inches below the surface. As stone was not often found in this region, the natives curiously scraped off the top soil. A stone eye looked up at them. By the time the expedition reached the site last year, another basalt head had been unearthed by the natives. Several other large ones were located, but no excavation was done at that time.

This spring the expedition unearthed 24 monuments within an area of only a square mile. Some are ten feet high and weigh an estimated 40 or 50 tons; others are little more than life size and weigh but a few hundred pounds. They were all found several miles from the tiny vil-

lage responsible for their discovery.

None of the gigantic stone heads, however, were in the place they had been set up originally. Succeeding generations of natives who did not regard them with the same awe as their creators had probably rolled them into ravines or hollows to get them out of the way.

Little is known about the history of the gigantic figures or who they represent. Another mystery is how they got to this site along the Rio Chiquito, about 60 miles inland from the Gulf of Mexico. The basalt from which they were carved did not come from that section, but must have been quarried at least 75 miles to the north. The San Lorenzo community is believed to have existed between 500 and 800 A. D. It is one of three major sites representing the La Venta civilization under investigation during the last few years.

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MEDICINE

New Better Epilepsy Medicines Coming

► NEW AND better medicines for epilepsy are coming, Dr. Jerry C. Price of the Neurological Institute, New York, declared when he appeared as guest of Watson Davis, director of Science Service, on the Adventures in Science program over CBS.

First of the new medicines coming to help the 750,000 epileptics in the nation is mesantoin. This will be on the market soon, Dr. Price stated. It is a sister drug of the hydantoin series which includes phenytoin sodium, commonly known as dilantin. Like dilantin, mesantoin controls convulsions in "grand mal", the big illness epilepsy, but it does not cause swelling of the gums as dilantin does in some patients, especially children.

Next to come as epilepsy remedies may be chemicals of the enzyme class which play important parts in body chemistry. The possibility of using these as epilepsy remedies appears especially significant because they may directly attack the cause of epilepsy, whereas other chemicals only check the convulsions which are a symptom of the disease.

Development of an enzyme attack on epilepsy goes back to the glutamic acid treatment introduced in 1942 by Dr. Price and Drs. Heinrich Waelsch and Tracy J. Putnam at the Neurological Institute. Subsequently, Dr. David Nachmansohn, of Yale, found that glutamic acid was linked to acetylcholine metabolism. Acetylcholine had been previously shown to cause convulsions. Dr. Nachmansohn has since discovered the enzyme and co-enzyme systems of acetylcholine metabolism.

"The chemical structures of these enzymes," Dr. Price said, "indicate the enzyme may be used in the treatment of grand mal and the co-enzyme in the treatment of petit mal types of epilepsy."

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PUBLIC HEALTH

World Health Problems

Health-restoring tasks of World Health Organization include prevention of epidemics, centers for typing disease, and surveys on malaria.

➤ HALF A DOZEN urgent health restoring and perhaps life saving tasks face the World Health Organization now being planned by the United Nations Health Assembly in New York.

Studies of the migrations of infantile paralysis and of fluctuations in the severity of polio epidemics need to be made.

Maps need to be made showing the amount in countries round the world of virus diseases, such as atypical pneumonia and infectious hepatitis, known to the layman as jaundice.

Diseases like diphtheria, dysentery and influenza should be routinely typed in as many centers as possible. The new influenza vaccine gives protection against types A and B 'flu virus, but health authorities need to know, before advising vaccination of a population, whether A, B, or some other type is starting up in epidemic form.

On tuberculosis, venereal diseases and disorders resulting from malnutrition, extensive information must be gathered so authorities will know the problems to be faced and overcome.

New surveys on malaria are needed.

These necessary postwar tasks for preventing epidemics in Europe are outlined by Knud Stowman, chief of UNRRA's epidemiological information service. Reading his report, it is clear

that they are the sort of tasks the World Health Organization may be expected to take on, though Mr. Stowman does not himself make that suggestion.

When plans were drawn up for a new international health organization after World War I, he points out, not enough data were available for an exact appraisal of the epidemic situation in the whole of Europe. The situation is much better at present. The records, though in some countries less complete than before the outbreak of World War II, have been put to good use.

"The epidemic situation would certainly have been far worse than it is, and also far more uncomfortable to countries which had to protect themselves," Mr. Stowman declares, had not these records been made available.

"We may go back 300 years to the end of the Thirty Years War to find misery and social chaos comparable to that now prevailing in many parts of Central and East-Central Europe. Even so, material destruction is far greater now than then."

Modern preventive medicine alone, he declares, has prevented a 300-year relapse in the epidemic situation. As it is, the relapse has been to 50 years ago, when diphtheria and typhoid fever dominated and tuberculosis was epidemic.

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AERONAUTICS

Supersonic Flight Suit

➤ A PRESSURE suit that will support life in a vacuum and allow for complete mobility has been developed by the Army Air Forces for high-altitude, supersonic flight. The new suit will be available in two years, Brig. Gen. Malcolm C. Grow, air surgeon for the AAF and inventor of the famous flak suit used in World War II, predicted.

Gen. Grow said the new suit was designed to protect airmen from possible rupture of pressurized cabins at extremely high altitudes. He said that the ultimate development for safe escape from high speed planes at high altitude would

be a pressurized cabin or capsule that can be ejected with the person inside. This capsule would have its own parachute.

Tests have shown, he reported, that airmen can be forcibly ejected from a plane only up to a maximum speed of 450 miles per hour. After that, the human body cannot withstand the terrific pressure of the air.

Identifying future high-speed planes will pose another problem, the air surgeon said. He announced that tests are now being made with films at the School of Aviation Medicine, Randolph Field,

Tex., to determine how fast a plane can be identified by the human eye. The films show a plane flying at 350 miles per hour and are stepped up to 1400 mph.

Describing the difficulties encountered in developing new equipment for changing conditions, Gen. Grow cited the light-weight AAF flak helmet as an example of improved equipment for protecting airmen. The flak helmet, using cold-rolled manganese steel instead of the heat process used in the M-1 infantry helmet, was produced only after many months of study, he said.

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ANIMAL NUTRITION

Corn Tassels Good Feed For Poultry, Livestock

➤ CORN TASSELS, normally discarded after being clipped from plants in producing seed for hybrid corn, make excellent feed for poultry and livestock.

Tassels taken just before pollen begins to shed contain approximately 12 times the vitamin A, eight times the vitamin B₂, twice the vitamin B₁, three times the niacin and three times the pantothenic acid potency of corn kernels. The protein level is also almost twice that of corn, J. M. Van Lanen, F. W. Tanner, Jr., and Shirley E. Pfeiffer of the U. S. Department of Agriculture discovered by analyzing tassels at the Northern Regional Research Laboratory in Peoria, Ill.

Although tassels comprise a relatively small part of the corn plant, an acre of corn planted for hybrid seed production is estimated to yield around 270 pounds of dry tassels. Thousands of tons of feed material could be saved each year by collecting these tassels that, in producing hybrid corn, must be removed before the pollen begins to shed.

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the House Committee on Military Affairs for further consideration. None of these attempts succeeded.

Ten amendments were voted. Their general effects are: (1) to increase the weight of military representation on the Control Commission, (2) to relax somewhat the provisions for government ownership of all patents pertaining to the production of atomic energy, and (3) to increase security precautions. The amended bill went to a conference committee of the Senate and House.

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ANOTHER ANGLE—Image of a drop of water as seen through goniometer eyepiece. Cross hair measures contact angle of the edge of the drop as it stands on an oil-protected surface of steel.

MEDICINE

Vitamin E for Purpura

➤ **SUCCESS** IN vitamin E treatment of purpura is reported by Drs. Floyd Skelton, Evan Shute, H. G. Skinner and R. A. Waud, of the University of Western Ontario.

Purpura is a relatively rare and sometimes fatal disorder in which purple patches appear on the skin because of hemorrhage and accumulation of blood under the skin. A tendency to bleed easily is another symptom, though the disease is not identical with hemophilia. The cause in most cases is unknown, though one form of purpura may come from certain drug intoxications. For some patients, removal of the spleen has brought about recovery.

Among the five patients helped by the vitamin E treatment, one had already had the spleen removed without being helped by this surgical measure. Besides these five, the doctors report great clinical improvement in one man in the last stages of purpura and aplastic anemia associated with advanced lymphosarcoma, a cancerous disease.

Three women who bruised easily and suffered from excessive uterine bleeding were also helped.

The effect of the vitamin E treatment appeared within one to two weeks, but the treatment must be continued for long

periods, if not indefinitely.

The report of this work, appearing in the American scientific publication *Science* (June 28), follows closely a report in the British publication, *Nature* (June 8), of Dr. Shute and associates of success with vitamin E in treatment of one form of heart disease.

This vitamin has been popularly known as an anti-sterility or fertility vitamin because in rats, at least, it is essential for reproduction.

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CHEMISTRY

Steel-Protecting Oils Tested With Water Drop

➤ **THE ANGLE** made by the edge of a drop of water, on a surface protected against rusting by oil, is being used to determine the value of the coating as a rust preventive, scientists of the Shell Oil Company state.

The method was devised by them, and they claim it to be a quick and reliable way to determine the effectiveness of rust protection oils.

When a drop of water is put on an oil-coated metal surface, it may remain nearly spherical flattened only on the under side, or it may flatten out broadly.

Laboratory tests, the scientists say, show that it flattens out more on a coating of good rust-preventive oil than it does on oil coatings of poor protection.

The more the drop of water flattens the smaller is the angle made by its upper surface with the base on which it rests. An angle of five to ten degrees means that the coating will probably give protection four times as long as when the angle is from 50 to 55 degrees.

To measure the angle, a special microscope is used. There are other factors in rust-protection oils that must be taken into consideration. This method, however, is a rapid simple control test in the formulation of oil protective coatings.

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ORDNANCE

Silent "Machine-Gun" Built in Laboratory

➤ A SILENT "machine-gun" built from electronic apparatus used in radios aided wartime research on the temperatures of gun barrels during firing.

The electronic device which simulated a machine-gun and fired over long ranges without noise was fitted with simple electrical meters to record the temperatures at different rates of firing.

Precise information to allow longer life and greater firing accuracy for actual machine-guns was obtained by using the device, Dean M. P. O'Brien of the College of Engineering, University of California, reported.

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MEDICINE

Penicillin To Save Unborn Babies From Syphilis

➤ **BABIES** THAT get syphilis before they are born will be cured before they are born by means of penicillin, if expectations of Dr. John H. E. Woltz and Miss Marjorie M. Wiley, of the University of Pennsylvania School of Medicine, are fulfilled.

Penicillin given to the mother reaches the unborn baby with its syphilis-healing power as early as the tenth week after conception, these scientists report in the *Journal of the American Medical Association* (July 27).

Arsenical drugs previously used to treat syphilis in adults and in babies before birth does not, so far as is known, reach the unborn baby's body before the latter half of pregnancy. Even then not enough of the drug may reach the baby to cure syphilis.

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ENGINEERING

Plans for Safer Living

Engineers prove that oxygen pumped into water aids purification; same wind-resistance principle applies to bridges and planes; more and better highways needed.

► PUMPING AIR into polluted rivers aids purification, the American Society of Civil Engineers meeting in Spokane was told by Prof. Richard G. Tyler of the University of Washington.

He cited the successful experiments of the past three summers at Park Falls, Wisc., where one and a half tons of oxygen a day was discharged into the waters of the Flambeau river. The result was shortening "to a considerable degree the length of stream utilized for the oxidation of the waste," he said, and it served to prevent nuisances caused by bacteria.

"Experience indicates," he said, "that the stream is a more efficient purification plant than presently used artificial methods of treatment." But, he added, the process is too slow for practical application unless air is added to the water to supplement the functioning of sewage treatment plants.

Prof. Tyler declared the natural methods of self-purification of streams, "which have been so important in conserving their waters for the use of mankind, may be reinforced efficiently and economically by stream reaeration," and expressed the hope that "further large-scale applications of this process will be welcomed by state and federal authorities."

Build for Wind Pressure

Airplanes and suspension bridges seem to the layman to have little in common, but engineers now state that the same principles used by aircraft makers in decreasing wind resistance can be applied to suspension bridge construction.

The principle, three experts told the meeting, is virtually identical whether applied to the plane or a bridge. The objective in bridge designing is to eliminate wind pressure, in the same manner as the plane makers have done away with wing flutter.

The three engineers reported on an investigation by them of the recent failure of the Tacoma Narrows suspension bridge which they made to secure information on how to make suspension structures safe throughout a normal lifetime. They are Prof. F. B. Farquharson of

the University of Washington, and C. E. Andrew and Dexter R. Smith, engineers of the Washington Toll Bridge Authority.

The Tacoma Narrows bridge failed because of constant oscillation in the winds prevailing in the section. It virtually "shook itself" to pieces, the engineers said. With the help of wind-tunnel studies, they have designed a bridge that they feel will be safe.

Their studies have convinced them, they declared, that investigations of winds as they exist may well become very important in the preliminary design studies of every suspension bridge, and will be a major control of the type of structure to be used.

Millions Needed for Roads

From \$16,000,000,000 to \$20,000,000,000 will be required to modernize the present highway system to accommodate present traffic, Charles Upham of the American Road Builders' Association told the Society.

The highway appropriation for 1946 should approximate \$750,000,000, and reach \$2,000,000,000 by 1949, and then continue at that level, he believes. It would be financed by gasoline and other taxes paid by highway users.

"In the years before the war the highway users paid into the government agencies in highway user taxes approximately \$2,240,000,000 per year," he stated. "With the additional ten to fifteen million new cars coming on the highways and the pent up desire of everyone to get out on the road again, the gasoline taxes collected by the state and federal governments would amply finance the cost of all new highway construction if it were all used for that purpose."

A heavy road building program is needed also to keep general economical conditions at a high level. For every dollar spent in road construction by modern methods, three dollars worth of business results, he asserted. For every man employed on the road building job, 1.7 are employed in the industries that furnish materials and equipment.

The full public construction program, including roads, buildings and other projects, should be adjusted, Mr. Upham said, to keep the total construction always above 12% of the national income. "During the '20's, full employment and prosperous conditions existed when construction volume exceeded 12% of the national income. Unemployment occurred when the volume went below this figure."

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INVENTION

Ball and Socket Joint Compensates for Own Wear

► BALL AND socket joints, important to users of many kinds of machines, will no longer need frequent replacement if a new joint recently patented lives up to expectations. It is called an automatic wear-compensating joint, the wear being compensated for by a tapering pin that spreads the two halves of the ball.

This ball of the joint is in two semi-spherical parts with curved inner surfaces that form a tapering bore to hold the tapering pin. The smaller end of the pin, projecting through the socket, holds a nut behind which is a spring. The spring tends to draw the pin tighter into the bore, and does so if there is any wear on the outside of the ball or the inside of the socket. This expands the sections of the ball, causing them to fit closely into the socket. A special system of lubrication helps reduce wear.

The patent number for this joint is 2,401,814 and it was awarded to Paul B. Burhans of Fort Myers, Florida.

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PHOTOGRAPHY

High Contrast Film For Television Movies

► BETTER TELEVISION pictures will result from use of a new du Pont motion picture film which carries an emulsion to obtain more detail in both highlights and shadows of outdoor scenes.

To save processing time and demonstrate the flexibility of handling of news pictures over a television system, the new film is used in negative form. A positive picture will appear on television screens. Since the picture is reversed as it passes through each stage of signal amplification in the television system, it is only necessary to have an odd number of amplification stages to end up with a positive picture on the screen.

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ENGINEERING

Noisy Air Hammer Replaced by Flame

➤ NO LONGER NEED a neighborhood be disturbed by the deafening noises of the air compressor cutting away pieces of concrete in street or sidewalk. A flux-forming fuel, and method of use, patented recently, permits a noiseless process. While it is particularly applicable in piercing round deep blasting holes in concrete and hard iron ore, it can be used to make grooves or cuts in the mineral materials.

The flux is a mixture of free-flowing finely pulverized materials, fed continuously into the blowpipe flame of an oxygen burner. It is composed of varying quantities of iron, manganese, silicon, aluminum, and either zirconium or calcium. A convenient way to get the mixture is to use ferromanganese, zirconium-silicon alloy, and aluminum, all in finely divided form. Calcium-silicon alloy can replace the zirconium alloy in whole or in part.

This mixture, when burned in gaseous oxygen, provides much heat. It forms oxides with the materials being cut, and these are in the form of a highly fluid slag. The gaseous products of combustion force the slag from the hole.

Patent 2,402,947 was granted Charles J. Burch, Plainfield, N. J., for this invention. It has been assigned to the Linde Air Products Company.

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MEDICINE

New Treatment for Glaucoma Stops Pain

➤ A NEW, PAIN-RELIEVING treatment for acute glaucoma, disease responsible for a large proportion of blindness, is arousing enthusiasm among eye specialists in this country and in Mexico.

The treatment was developed independently and at almost the same time by Dr. Manuel Jose Icaza, of Mexico City, and Dr. J. M. Levitt, of Brooklyn, N. Y., who has just finished almost four years of Army service.

The treatment consists in injecting an anesthetic solution into the region behind the eyeball. This blocks the sensory nerves of the eye, preventing their carrying pain messages. Before and after the injection, solutions of pilocarpine and physostigmine are dropped into the eye and epinephrine is injected with the local anesthetic.

As a result, the pain disappears completely and all signs of too great tension in the eye rapidly and completely disappear. The opacity of the cornea, caused by swelling, clears up, the pupil contracts strongly under the effect of the drops given before and after the injection, the redness of eyelids and eye goes away, the eye softens and in some cases the visual power improves and the field of vision is enlarged. Whether these effects on eyesight occur depends on how much permanent damage to vision has taken place.

Besides giving the patient relief from great pain, this treatment puts the eye into perfect condition for operation and allows the surgeon to plan the best operation for each case and to perform it at exactly the right time, instead of having to do an emergency operation under conditions more likely to lead to failure than success.

Dr. Icaza does not believe this treatment is a remedy for glaucoma. He considers it the most useful palliative yet found. He has used it successfully on more than 200 patients in the past five years.

The method of injecting an anesthetic into the tissues at the back of the eye socket has long been standard practice for operations on the eye.

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ASTRONOMY

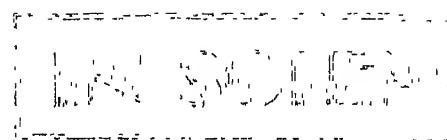
World Chain of Coronagraphs

➤ A WORLD-WIDE chain of telescopic coronagraphs, permitting the antics of the sun to be watched at all times as if there were a perpetual eclipse, may result from the visit of Dr. Bernard Lyot to this country. The coronagraph is the invention of Dr. Lyot, famous French astronomer.

Such continuous eclipse observations will help considerably in making radio forecasts and in foretelling what will happen to the weather.

Starting at Harvard Observatory, Dr. Lyot will visit all the large observatories in the United States and Canada, including the Climax, Colo., station of Harvard, 11,500 feet above sea level, where is located the only coronagraph in America. He will test seeing conditions at each of the observatories to compare with conditions on the Pic du Midi, high mountain in southern France, where he observed with his coronagraph throughout the war despite the German occupation.

Science News Letter, July 27, 1946



INVENTION

Tin-Plating Sheet Metal By Electricity

➤ TIN PLATING of sheet metal, to be used in making the familiar "tin cans" and for other purposes, was carried out for years by the so-called dipping process. During the war a process of applying the tin in an electrolytic bath was developed and used largely because a thinner coat could be applied and less of the critical metal used. A patent, 2,402,185, on one electroplating composition and process has been granted to Ernest W. Schweikher, Shaker Heights, Ohio, assignor to the E. I. du Pont de Nemours and Company, Wilmington, Del.

For electroplating, compositions in which the tin is in a stannous compound are found satisfactory but these compounds are not stable or, if dry, become partly insoluble in storage. This patent is given for a mixture of stannous tin and smaller quantities of other chemicals that increase stability and produce no undesirable effects upon the tin deposits. A dry composition included is 66% stannous chloride and 33% sodium fluoride, the remainder being equal amounts of potassium ferri-cyanide and sodium thiocyanate.

Science News Letter, July 27, 1946

RESEARCH

Acetylene Plastic Wins Stalin Prize

➤ PLASTICS developed from acetylene have won a Stalin prize award for Dr. Ivan Nazarov, director of the organic chemistry laboratory of the Academy of Sciences Institute in Moscow.

A pupil of the late Russian chemist Favorsky, Dr. Nazarov has developed a number of organic compounds in the vinylacetylene series. Among these compounds is the base for strong glues used to join glass, plastics, woods, metals, stones and other solids.

He produced transparent resins by polymerization of ethers, esters and glycols produced during the condensation of vinylacetylene with ketospirits, and has conducted research on organic compounds.

Science News Letter, July 27, 1946

RADIO

Radio "Hum" Attributed To Interstellar Space

➤ RADIO SIGNALS received from outer space on the wavelengths around five meters are attributed to interplay of free electrons in interstellar space, not blasts of radiations in the distant stars.

The latest discussion of origin of the mysterious radio "hum" of the universe, that received some attention following the radar echoes from the moon, is contained in a report to the London science journal, *Nature* (June 15), from astronomers of the Yerkes Observatory of the University of Chicago, Drs. J. L. Greenstein, L. G. Henyey, and P. C. Keenan.

The sun is known to send out radio frequency radiation in connection with sunspot activity. This caused the suggestion that the radiation of a similar sort from interstellar space might be due to a sort of symphony of similar radiation from a great multitude of stars throughout the universe.

Computations made by the American astronomers show that this source of radiation would produce an intensity much lower than that actually received on special radio receivers tuned to the outer universe. They conclude the origin is truly in the space between the stars.

Science News Letter, July 27, 1946

SAFETY

Army Life Raft Suitable For Commercial Planes

➤ ODD APPEARING life rafts, developed by the Army, bear little resemblance to any ever seen before. Their unusual shapes give them their names, the "Wheel" and the "Covered Wagon." A particular feature is their size.

Both are suitable equipment for giant transports on ocean routes as well as for the military crafts for which they were developed. They are equally suitable for use on surface vessels. The Wheel is large enough so that 104 men in the water can cling to it; the Wagon keeps 20 men comfortable and dry.

They are made of rubber, and when packaged for storage in a plane or on ship deck require little space, not much more than a large suitcase. They are the types that automatically inflate them-

selves with carbon dioxide gas from attached pressure tanks when released from their packaging.

The Wheel resembles a large doughnut with two cross tubes all inflated with the gas. Ropes are attached to all tubes for survivors in the water to grasp. The raft is a temporary means of survival until boats can come to the rescue.

The Covered Wagon is boat-shaped but has a large canopy to protect its occupants from sun and storms. It is a rubber raft with side walls, and inflated seats around the sides provide comfort for the men in it and insulate them from coldness of the water below. The arched supports for the canopy are inflated rubber tubes. Attachments are available for mounting an outboard motor. The raft and canopy weigh 178 pounds, and when in storage make a package less than three feet long and about two feet square.

Science News Letter, July 27, 1946

MICROGRAPHY

Crystal Structure of Molecules Studied

➤ A NEW LOOK has been obtained into the basic molecular structure of the crystals of disease viruses. Electron microscope photographs of 26,000 times magnification taken at the National Institute of Health show the molecules themselves perched upon the face of a virus crystal in a regular arrangement.

One of the unsolved problems in studying these disease-causing viruses is the structure of their crystals. Once scientists know how the molecule particles array themselves within the crystal they will have one more hint as to how to proceed in fighting the virus itself in the human, animal or plant that it makes ill.

Two U. S. Public Health Service scientists, Dr. W. C. Price, also with the University of Pittsburgh, and Dr. Ralph W. G. Wyckoff, have just published scientifically in the London journal, *Nature* (June 8), actual electron microphotographs of the molecules spotted in regular array on the face of a crystal of bean mosaic virus.

The next step after this exploration will be to apply the new method to protein and other large molecule substances. This new way of reaching down into the minutely small structure of matter thus promises to give science a new probe into the fundamental process of living matter.

Science News Letter, July 27, 1946

WILDLIFE

Duck and Goose Decline Reported as Serious

➤ A DUCK'S LIFE is a hard one, and the prospects are that it will get harder

Hunters' shots, disease and drought in the northern breeding grounds have cut the duck and goose population of the United States by 36% in two years. Meanwhile, the number of hunters has increased more than half a million, with 1,686,368 gun-carrying enemies searching for the remaining 80,000,000 wildfowl.

Officials of the U. S. Fish and Wildlife Service term the situation "serious," and their latest field reports indicate that the duck decline has hit all regions and all species.

The answer, they declare, is shorter seasons for hunters or smaller bag limits or both.

While many of today's hunters were in the Armed Forces aiming at Nazis and Japs, the wildfowl census reached a peak in 1944 with an estimated 125-350,000 birds. But peacetime guns are being aimed at an already diminishing number of ducks and geese.

Science News Letter, July 27, 1946

AERONAUTICS

Long Range Altimeter Aids in Blind Flying

➤ PLANES won't be likely to crash into skyscrapers when using a new type of long-range radio altimeter, now being installed in transport planes. It gives the plane's height in feet above the earth or any obstacle below.

Although not designed to detect a building ahead as radar might, the altimeter enables the pilot to maintain safe altitudes when sudden changes in reading indicate he is flying over a city with many towering buildings. The instrument is especially valuable in facilitating blind landings, since it gives the exact altitude continuously within a few feet, from ground level up to 400 feet.

The present instrument, using a high frequency radio transmitter and receiver, was adapted from similar equipment developed for the Army Air Forces during the war. It automatically computes the exact distance to the terrain directly below by gauging the time needed for short signals beamed from the instrument to be reflected back.

Science News Letter, July 27, 1946

ASTRONOMY

Three Planets Visible

Three planets can be viewed during August. In order of their brightness they are Venus, Jupiter and Mars. The brightest star on August evenings is Vega.

By JAMES STOKLEY

➤ GONE FROM the evening sky of August is the brilliant display of planets that we enjoyed during the late spring, but three can still be seen in the early evening. Only one of them, Jupiter, remains up long enough to get a place on the accompanying maps, in which the heavens are depicted for 10:00 p.m., standard time, on Aug. 1, and an hour earlier in the middle of the month.

These three planets are all in the constellation of Virgo, the virgin. Venus is the brightest of the trio, about 18 degrees above the horizon at the time the sun sets. With magnitude minus 3.8, it is the first to appear. Next in brightness (of magnitude minus 1.4), and farther to the south, is Jupiter. Mars is considerably fainter, equal only to a second magnitude star. All three planets are somewhat dimmed by reason of their proximity to the horizon, an effect of the greater thickness of air which their light has to penetrate on the way to us.

At the first of August, Venus will be lower than Mars, but Venus moves faster, and on Aug. 9 she passes her fainter brother, at a distance of apparently only a little more than the diameter of the moon. The close approach, however, takes place in the morning, at an hour when they are not visible from this part of the world. The night before, as well as that of the 9th, will show them very close. Not until Sept. 3 will Venus pass Jupiter.

The other two naked-eye planets have both passed into the morning sky. Mercury, in line with the sun, is behind it on Aug. 2, and by the 20th it will reach its position farthest west of the sun. Then it will be seen low in the east before sunrise. Saturn passed behind the sun in July, and is now in the constellation of Cancer, the crab, which rises an hour or so before the sun.

Almost directly overhead, in the constellation of Lyra, the lyre, we now see Vega, brightest of the August evening stars. Second brightest is Arcturus, toward the west, in Bootes, the bear-driver. Then comes Altair, high in the south,

part of Aquila, the eagle. Fourth is Antares, distinctly red in color, which is easily located in Scorpius, the scorpion, low in the south. Directly east of Vega is Cygnus, the swan, and in the figure we find Deneb, the fifth of the stars of the first magnitude visible these evenings.

Milky Way Prominent

At this time of year the Milky Way—Milton's "broad and ample road whose path is gold and pavement stars"—comes into its best position. It is hard to see in competition with city lights, but from the country, on a dark, moonless night, it can well be appreciated, extending from the northeastern horizon, upwards through Cassiopeia, Cepheus, and down to the south through Cygnus, Aquila and Sagittarius. Though it looks to the naked eye as a continuous path of light, through a telescope, or even a good pair of binoculars, one can see, as Galileo did in 1610, that it is a swarm of stars.

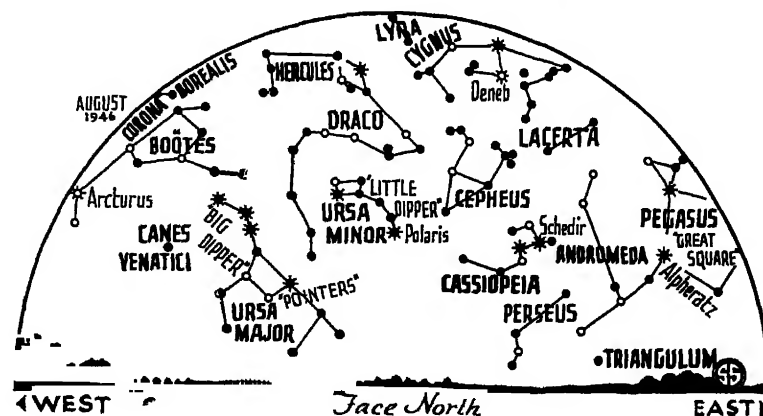
It was much later that astronomers began to understand the Milky Way and the relation of the sun and other stars to it. This was done by statistical methods, which ignore individual differences among the stars. They vary greatly in their intrinsic brightness, or candlepower, so when you see a faint star in the sky it may be a bright star far away—or a really faint one that is much closer. However, when considering large numbers of stars, the individual differences iron out, and we can justifiably assume that the fainter a star appears, the farther away it is.

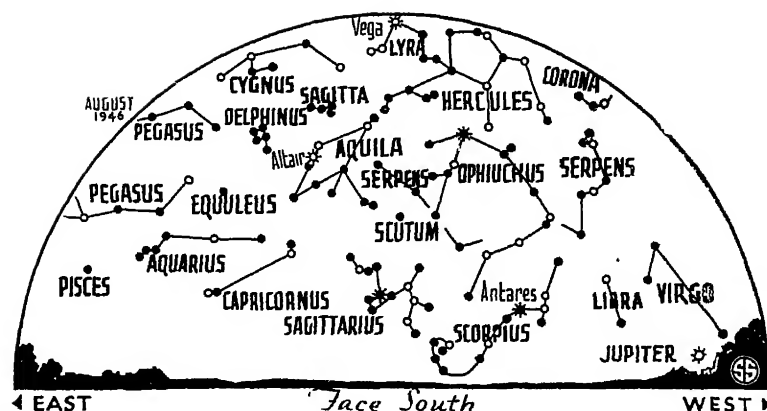
Astronomers classify stars according to their brightness by magnitude and, neglecting differences of individual stars, the average one of the third magnitude is about 1.6 times as far as the average second magnitude star. Thus, every time we go from one magnitude to the next fainter, we reach out 1.6 times as far into space—that is, we are observing a spherical volume of space that much greater in radius. This extra distance of 1.6 times means that we observe about four times the volume. Consequently, if the stars are uniformly distributed, there ought to be four times as many third magnitude stars as those of the second, four times as many of the fourth as of the third, and so on.

Counting the Stars

Some two centuries ago astronomers began to make such counts, of selected sample areas of the sky. There are a total of 40 stars of the first and second magnitudes, and 135 when we include also those of the third. Thus the ratio between two and three is 3.4, not far from the figure of four. There are 4800 stars down to the sixth magnitude, faintest visible to the naked eye, and 15,000 down to the seventh, so here the ratio between magnitudes is only 3.1. The largest telescope will detect stars down to the 20th magnitude, and there are about 1,000,000,000 that are as bright or brighter than this. As there are some 560,000,000 stars down to the 19th magnitude, the ratio, between 19 and 20, is only 1.7, which shows that the farther away we get, the more thinly the stars are distributed.

If we could observe down to the 29th magnitude, we could detect a total of





* * * • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

about 100,000,000,000 stars and then the ratio would drop to one. That is, a further increase to reveal stars of magnitude 30 would not show any more. Then we would have reached the end of our stellar system.

Not only do such counts tell us that the stars are confined to a limited system—they can also tell us its shape. Among the naked-eye stars there are about four times as many in a given area toward the Milky Way as in other directions. For stars of the 20th magnitude they are about 44 times as numerous, so this indicates that in the direction of the Milky Way we could go much farther before coming to the end. The whole system, which we call the Galaxy, thus has the shape of a vast grindstone, of such a diameter that light, traveling 186,000 miles a second, takes about 100,000 years to cross it. We are out quite a distance from the center, toward the constellation of Sagittarius, which we now see in the south, and that is why the Milky Way is so bright in that direction.

Millions of Galaxies

But although these stars of our own system are limited, there are millions of other such systems—other galaxies—out beyond the borders of ours. One of the nearest can be seen with the naked eye as a hazy spot of light in the constellation of Andromeda. The light from this takes about 700,000 years to reach us. With the 100-inch telescope at the Mt. Wilson Observatory, still the world's largest, galaxies have been detected which are so distant that their light spends about 500,000,000 years on its way to us. The 200-inch instrument, nearing completion on Mt. Palomar, will reach out about twice as far, and it is in the observation of these distant ob-

jects that this new astronomical eye will find one of its most important tasks.

Celestial Time Table for August

| Aug | EST | |
|-----|------------|---------------------------------------|
| 2 | 10:00 a.m. | Mercury in line with sun |
| | 7:53 p.m. | Moon passes Jupiter |
| 4 | 3:55 p.m. | Moon in first quarter |
| 6 | 7:00 p.m. | Moon farthest, distance 251,300 miles |
| 9 | 9:00 a.m. | Venus passes Mars |
| 12 | Early a.m. | Meteors of Perseid shower visible |
| | 5:26 p.m. | Full moon |
| 19 | 8:17 p.m. | Moon in last quarter |
| 20 | 3:00 p.m. | Mercury farthest west of sun |
| 22 | 5:00 a.m. | Moon nearest, distance 229,000 miles |
| 24 | 10:59 a.m. | Moon passes Saturn |
| 25 | 5:44 a.m. | Moon passes Mercury |
| 26 | 4:07 p.m. | New moon |
| 29 | 12:38 p.m. | Moon passes Mars |
| 30 | 5:35 a.m. | Moon passes Venus |
| | 1:08 p.m. | Moon passes Jupiter |

Subtract one hour for CST, two hours for MST, and three for PST. Add one hour for the corresponding Daylight Saving time.

Science News Letter, July 27, 1946

SURGERY

Surgery Aids Cancer Of Prostate Gland

► CHANCES OF one kind of cancer patients surviving five years, the customary period for appraising results of cancer treatment, have been increased from 14.1% to 20%, it appears from a report of Dr. Charles Huggins of the University of Chicago (*Journal of the American Medical Association*, June 15).

The patients Dr. Huggins reported were all elderly men with cancer of the prostate gland. The treatment was surgical removal of the sex glands.

Of the 21 patients operated on five years ago, one died of pneumonia within eight days of the operation. One is alive but has a slowly advancing prostatic cancer. Four, including one man who was 71 years old and dying at the time of operation, are now alive and well with no clinical or laboratory evidence of cancer.

Reports quoted by Dr. Huggins of other methods of treating this kind of

cancer show that the highest five-year survival rate was 14.1%, with some as low as 1.3%.

In spite of general acceptance of five years without recurrence as a cure for cancer, Dr. Huggins states that it is premature to suggest that any of his patients has been cured.

The effectiveness of the operation is apparently dependent on whether the cancer is dependent on male sex hormones and whether the sex glands are contributing functionally significant amounts of the total production of these.

The 15 patients who did not survive the five-year period lived from three and one-half to 63 months after the operation.

Among the five-year survivors, signs of spread of the cancer to the bones are either absent or equivocal, although all had signs of bone cancer at the time of the operation.

Science News Letter, July 27, 1946

PHOTOGRAPHY

Timing Devices Make X-ray Photography Safe

► X-RAY PHOTOGRAPHY has had its guess-work removed by two timing devices on which U. S. patents have just been issued to a pair of Chicago inventors, Russell H. Morgan and Paul C. Hodges.

The first device consists of a photocell with suitable electrical hookup to swing a pointer over a graduated scale. A trial "shot" of X-rays is sent through the subject onto the photocell; their remaining intensity determines the amount of current and hence the swing of the pointer. The scale is graduated directly in seconds needed for proper exposure of the film.

The second device improves on the first, in that a preliminary "shot" is not necessary. The photocell receives the X-rays after they have passed through both the subject and the photographic film. Current from the photocell, instead of moving a pointer, builds up a charge on a condenser. When it reaches a predetermined level it acts through a thyatron-controlled relay to break the X-ray circuit and end the exposure. The whole operation is automatic; the roentgenologist does not even need to know what the proper exposure time is.

Rights in both patents, Nos. 2,401,228 and 2,401,229, are assigned to the United States of America, as represented by the Director of the Office of Scientific Research and Development.

Science News Letter, July 27, 1946

Do You Know?

Rats on farms are costly; three of them will eat daily as much as two hens.

Cod-liver oil as a possible substitute for linseed oil in paints is being investigated in Norway.

The excess of *births over deaths* in the United States during 1945 indicates a population increase of 154 per hour.

New *action mechanism* in pianos is now constructed of magnesium and plastic materials; substituting magnesium for wood parts eliminates warping.

The *Big Dipper* swings completely around the North Star in 24 hours; the different positions of the Dipper in the sky during different seasons are due to stars rising earlier each day.

Fluorescent light tubes have proved superior to ordinary electric lights in luring Clear Lake gnats into traps; this bothersome pest, which breeds in enormous numbers, takes its name from the Clear Lake region of California.

Wood-waste utilization is a subject of special research at the University of New Hampshire; work is concentrated on plastics from sawdust, the use of lignin in plant-growing, and wood-yeast feeds for cattle and poultry.

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MEDICINE

New Approach to Checking Spread of Polio

➤ A NEW SLANT on how infantile paralysis spreads and a possible new approach to methods of checking its spread appeared in a report by Dr. Thomas Rivers of the Hospital of the Rockefeller Institute, New York, at the meeting of the American Medical Association in San Francisco.

Scrupulous personal cleanliness on the part of every one as well as care to protect food, milk and drinking water from flies would be the weapons for preventing the spread of polio, it appears from Dr. Rivers' report. With many other scientists, he believes that the infantile paralysis virus leaves the bodies of patients and healthy carriers in intestinal wastes, medically termed feces. Contact with the virus from this source, he believes, is how the next person gets infected.

Experience while serving with a Naval medical research unit on Guam during the war showed Dr. Rivers how easily the polio virus or other germs leaving the body in feces can spread.

The problem on Guam was hookworm, not infantile paralysis. But it convinced Dr. Rivers that "many persons and their clothes are invisibly but dangerously contaminated with feces."

"From a small cotton blanket on which an infant with hookworm had rested for 24 hours and which showed no visible evidence of fecal contamination, 20,000 infective hookworm larvae were obtained after the blanket had been kept in a moist condition for five days," Dr. Rivers reported.

The evidence from this apparently clean but bacteriologically dirty blanket helped the Navy doctors check hookworm. It may furnish a better weapon for fighting the spread of polio.

Flies may spread the polio virus as they carry typhoid fever germs. Dr. Rivers, however, does not think they play a major role in infantile paralysis. He debunked the idea of controlling polio by DDT sprayed from airplanes.

Spraying DDT from airplanes to kill flies to control infantile paralysis, he said, would do about as much good as spraying soapy water from planes for personal cleanliness.

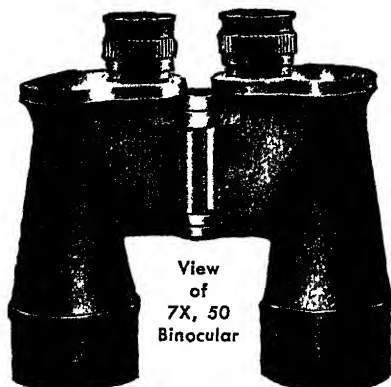
Science News Letter, July 27, 1946



POTATO SEEDS—These potato balls look so much like miniature green tomatoes that when they appear in somebody's garden they usually start an excited report of a potato-tomato hybrid. Actually they are only the normal seed-containing fruit of the potato plant, as shown in this U. S. Department of Agriculture photograph, and are noteworthy only because of their rarity. Luther Burbank started his career by planting the seeds from some of these potato balls, and the one good plant that came up out of the crop became the famous Burbank potato.

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| 624-Q | Neutral Ray Filter size 4 1/2" x 2 1/2" ----- | .25 |
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Tame or Familiar?

➤ FREQUENTLY we hear of a person living on the farm or in the woods who has "tamed" some wild animal not usually kept as a pet, like a porcupine, or a groundhog, or a skunk, or even a toad. We may also hear of animals in a given locality being so "tame" that one can walk right up to them.

Both these uses of the word are somewhat inaccurate. Ordinarily timorous or cautious animals, like deer or beaver, that let you approach them should properly be called fearless. Actually, such fearlessness is the normal attitude of ani-

mals toward man unless he has given them cause to regard him as a predator, and in the same class with wolves and wildcats.

The person with a "tame" wild animal as a rule gets no further than having offerings of food accepted, or perhaps being permitted to stroke its fur or scratch its ears. This degree of intimacy is tolerated, and even apparently enjoyed, by a great variety of animals, which otherwise live their normal wilderness lives. Naturalists refer to such animals as "familiar" rather than "tame".

A step toward real tameness comes if the animal consents to share quarters with its human friend. That is an approach to what zoologists call commensalism, which merely means living in the same house. As a matter of fact, some of our supposedly domesticated animals, cats for example, though housemates of man for scores of generations, are really no tamer than that. They accept our food, affection and shelter, and give us nothing in return but their pleasant company. The same can be done with prairie-dog or armadillo, starting from scratch.

An animal may be regarded as fully tamed when it makes some tangible return to its human partner for the favors it receives, such as helping in hunting, or guarding property, or bearing bur-

dens. Dogs illustrate this behavior phase very well, and so do horses. Some cats approach this level, but they are exceptional individuals.

Wild animals can be fully and satisfactorily tamed. Wild horses, after proper handling, become good saddle and draft animals. Wild elephants are constantly being rounded up in the Asiatic tropics, and live long lives of service to man. Hawks and cheetahs, the very symbols of fierce independence, are captured and tamed into excellent hunting servants.

There is thus no question of the tamability of wild animals; only, before we call an animal tame we should be sure its behavior towards man qualifies it for that title.

Science News Letter, July 27, 1946

PHYSICS

Universe's Ultimate Forces Probed

➤ AN UNDERSTANDING of the ultimate forces of the universe promises to result from the hundreds of millions of electron-volts that atomic physics is about to let loose in new atom smashers.

This may be more important than the development of the atomic bomb.

Dr. Robert J. Oppenheimer, director of the Los Alamos Atomic Bomb laboratory when the bomb was first made, also predicted to the American Physical Society meeting at the University of California:

1. Fundamental revision of present theories of matter.
2. Extension of new knowledge to other fields of science.
3. Discovery of new elementary nuclear particles that will give a better picture of the atom and the principles upon which it works.

Man is now about to duplicate nature's most powerful atom-smashing, the cosmic rays that consist of protons hurtling into the earth's atmosphere from outer space, crashing into atmospheric atoms and causing birth of an atomic particle called a mesotron. It takes about 250 million electron volts to knock a mesotron out of another proton, and atom smashers are now reaching that energy and beyond.

Particles now known to be a part of an atom were listed by Dr. Oppenheimer as the electron, proton, neutron, positron, mesotron, gamma ray, and a hypothetical neutrino for which evidence has not been found.

Science News Letter, July 27, 1943

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• Books of the Week •

ASTRONOMY. A Textbook for University and College Students—Robert H. Baker—*Van Nostrand*, 461 p., tables and illus., \$4., 4th ed. For use in introductory courses requiring no special preparation in mathematics and physics. This 4th ed. contains a brief treatment of celestial navigation, and results of recent inquiries in astronomy.

CHECKLIST OF THE COLEOPTEROUS INSECTS OF MEXICO, CENTRAL AMERICA, THE WEST INDIES, AND SOUTH AMERICA Part 4—Richard E. Blackwelder—*Smithsonian Institution*, 763 p., paper, 50 cents United States National Museum, Bull. 185

CHEMISTRY AND HUMAN AFFAIRS—William E. Price and George H. Bruce—*World Book Co.*, 788 p., illus and diags., \$2.68. A textbook implementing a general high-school chemistry course, with broadly cultural as well as utilitarian value

ELECTRONICS IN INDUSTRY—George M. Chute—*McGraw-Hill*, 461 p., illus. and diags., \$5. A broad introduction to the use of electronic circuits and equipment, outlining the industrial uses of tube circuits and giving detailed explanations of a large number of electronic equipments now serving in industrial plants.

FOOD CONSUMPTION LEVELS IN THE UNITED STATES, CANADA, AND THE UNITED KINGDOM—*Government Printing Office*, 58 p., tables, paper, 15 cents Third report of a Special Joint Committee set up by the Combined Food Board.

HIWASSEE ISLAND: An Archaeological Account of Four Tennessee Indian Peoples—Thomas M. N. Lewis and Madeline Kneberg—*Univ. of Tennessee Press*, 311 p., tables, illus. and maps, paper, \$5.50. The story, representing nearly two years of large scale excavation, of the prehistoric people who successively inhabited one of the largest islands in the Tennessee River.

AN INTRODUCTION TO BOTANY—Arthur W. Haupt—*McGraw-Hill*, 425 p., illus., \$3.50, 2nd ed. A textbook intended to introduce the college student to the science of plant life, and attempting to lay the foundation for further studies, rather than treat the

subject exhaustively.

OUR FAR EASTERN RECORD The War Years—Shirley Jenkins—*Institute of Pacific Relations*, 96 p., paper, 25 cents. The third pamphlet in a series of documentary studies of American Far Eastern policy, attempting to answer questions regarding the nature of our Far Eastern Policy.

PERMIAN FUSULINIDS OF CALIFORNIA—M. I. Thompson, Harry E. Wheeler, John C. Hazzard—*Geological Society of America*, 77 p., maps and illus., \$1.25. Geological Society of America, Memoir 17.

PROBLEMS IN THE IMPROVEMENT OF READING—Constance M. McCullough, Ruth M. Strang, Arthur E. Traxler—*McGraw-Hill*, 406 p., tables, \$3.50. A book to aid teachers and administrators in solving the reading problems which they encounter in their schools, ranging in scope from the elementary schools to adult education.

RACIAL MYTHS—Mary Ellen O'Hanlon, O. P. —*Rosary College*, 32 p., paper, 25 cents. A scientific examination of some of the erroneous ideas and prejudicial theories so detrimental to social and interracial justice.

RADAR. What It Is—John F. Rider and G. C. Baxter Rowe—*Rider*, 72 p., illus. and diags., paper, \$1. A complete, non-technical explanation of the principles of radar, of its applications, and of its various uses by the Armed Forces

A VEGETABLE GARDENER'S HANDBOOK ON INSECTS AND DISEASES—*Government Printing Office*, 30 p., illus., paper, 15 cents. An aid to the gardener in identifying the more common insects and related forms and the more common diseases that attack vegetable gardens in the U. S., and in providing him with simple directions for the control of these pests

X-RAYS IN PRACTICE—Wayne T. Sproull—*McGraw-Hill*, 615 p., tables and illus., \$6. A comprehensive treatment, giving the reader a broad understanding of X-rays, their nature, and the many purposes for which they may be used.

Science News Letter, July 27, 1946

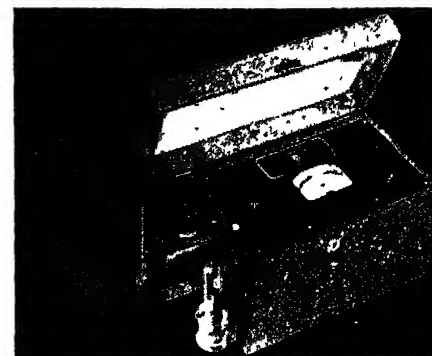
equipment installed on pilot boats. One bank will soon use facsimile transmission to send copies of checks presented for cashing to a central office to identify the signature.

The facsimile transmitter is a scanning machine with a spinning cylinder about which the copy to be sent is wrapped. A sharp point of light traces a closely spaced spiral line on the surface of the paper, and causes the lights and darks of the copy, made by print or pictures, to be reflected with varying intensity upon a photoelectric cell.

The electric currents from the cell caused by the varying light are converted into radio waves by special equipment in the broadcasting apparatus. These waves are received on a cylinder in the receiver, spinning at identically the same speed as the transmitter cylinder. They pass through sensitized paper, leaving an exact copy of the original.

Science News Letter, July 27, 1946

An unusual thing about the *white stork* is that for ages longer than recorded history it has built its nest on roofs or close to human habitations.



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RADIO

Next: "Reading by Radio"

➤ **FACSIMILE** radio receivers will soon join ordinary receivers and television sets in the modern "radio" home. They will provide exact copies of letter-sized, four-column news sheets put on the air at frequent intervals by special broadcasting stations.

Facsimile transmission of pictures, charts, printed pages and letters by radio is not new, but improved transmitting method and receiving equipment now make the procedure more practical. The installation of receivers in homes is dependent upon the erection of broadcasting stations to put the printed news on

the air. One such station has been completed in New York, and six others elsewhere will follow soon.

This first is FM-Facsimile broadcasting station WGHE, of Finch Telecommunications. Successful demonstrations have recently been made in transmitting the letter-size newspaper, at the rate of 500 words a minute, to receiving sets in the city, and to others on moving passenger trains and soaring airplanes.

Similar facsimile transmission may have many other uses. The approach of vessels below New York harbor is now being reported by Radio-Telefax

New Machines And Gadgets

⚙️ **GASOLINE** blow torch in combination with a removable soldering iron, developed in Germany, has a burner head of common design, a fuel tank inside its handle, and a pump within the tank. The soldering copper is fastened to the top of the torch and is held in the flame.

Science News Letter, July 27, 1946

⚙️ **FIBER-METAL** package for frozen foods eliminates the inner sealed bag or outer wrap. It has metal ends easily removable with an ordinary hook-type opener. The walls are of paraffin-impregnated fiber, and the whole is semi-rigid in construction.

Science News Letter, July 27, 1946

⚙️ **PLASTIC SHOES** for women, recently patented, have their soles, instep supports and elevated heels in a single molded piece. Fabrics, preferably in the form of ribbons, pass around the foot and ankle. The plastic used may be transparent or colored.

Science News Letter, July 27, 1946

⚙️ **FACSIMILE** equipment just installed in a New York bank facilitates the cashing of checks. The machine sends an exact picture of any check over a telephone wire to the bank's central signature file for verification. A report is received in about one minute.

Science News Letter, July 27, 1946

⚙️ **NEW TYPE** syringe, greatly simplifies the technique of administering penicillin as it makes possible the use of a one-shot cartridge containing a 24-hour dose. The low cost of making the



plastic device shown in the picture permits disposal of the syringe after a single use.

Science News Letter, July 27, 1946

⚙️ **AIR FILTER** in railroad passenger cars contains activated carbon through which the air in the car is circulated. It will eliminate by adsorption odors from smoking, food, drink, and even from passengers themselves. The equipment requires relatively little space.

Science News Letter, July 27, 1946

⚙️ **MOISTURE REMOVER**, to dry air passing through compressed air lines, is a cylindrical chamber with a perforated hollow structure projecting inside from the air-outlet end. This is filled with steel wool surrounded by felt. The air inlet is on one side of the cylindrical chamber.

Science News Letter, July 27, 1946

⚙️ **TANK** for keeping fish fresh, as caught or after cleaning, preserves by re-

placing much of the air with oxygen after the fish are packed. The tank, with oxygen constituting 35% or more of the pressurized gaseous content, is hermetically sealed.

Science News Letter, July 27, 1946

⚙️ **BOTTLE CARRIER** for corrosive and staining chemicals is cushioned with material that is acid, caustic and corrosion resistant, and is designed to decrease bottle breakage in handling or transporting. Bottles are completely enclosed within the carrier by pulling a draw string at top.

Science News Letter, July 27, 1946

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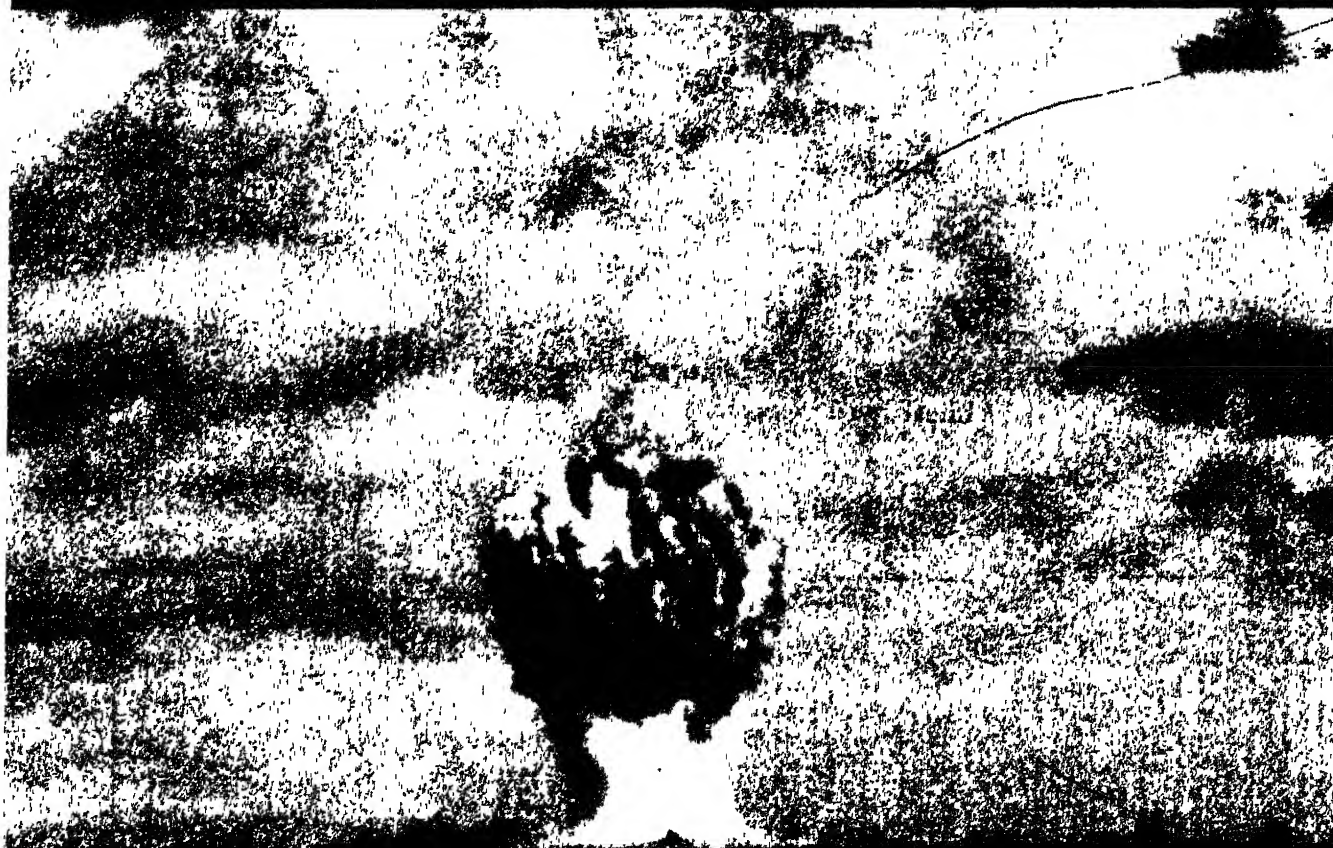
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SCIENCE NEWS LETTER



A SCIENCE SERVICE PUBLICATION

PHYSICS-OCEANOGRAPHY

Upper Air, Undersea War

Possible wars in the atomic age take research into the ionosphere and under the surface of the sea; reports wirelessly from Bikini by Science Service correspondent.

➤ TWO WILDERNESSES of the world—the upper atmosphere and the vast reaches of water beneath the surface of the sea—are the regions toward which military men and scientists are turning as major media through which, if diplomacy fails again, wars of the atomic age will be conducted. Test “Baker” at Bikini Lagoon drew attention to these possibilities, and may provide some data on the subsurface future.

Two major reasons can be seen for this trend: first, it is necessary for military men, who are charged with the job, to seek places in which machines of war can operate with some safety from the very efficient means of counterattack now available and from which attacks on an enemy can be launched successfully; and, second, atomic power itself may make it possible to build the types of planes and submarines which would have to be constructed to survive in these regions.

A number of pieces can be fitted together to make a credible pattern of this future.

As for the use of atomic power in new war weapons, Dr. Glenn T. Seaborg, University of California chemist and a leader in atomic bomb research, said in a recent lecture:

“It may be even feasible sometime in the future to use atomic power plants in large submarines, giving to such vessels the highly desirable advantage of extremely long cruising ranges. It is also probably not out of the question that such power plants might be used for the propulsion of some of the very large airplanes which are being planned for the future. One must not lose sight of the possibility that new improvements in shielding arrangements, etc., will make it possible to reduce appreciably the bulk of the installations.”

Dr. Seaborg was referring to the fact that, with present knowledge, an atomic power plant would have to be surrounded with thick, heavy shielding to protect personnel from deadly radiations.

This scientific viewpoint was strengthened from a practical military viewpoint in a magazine article by Admiral Chester W. Nimitz, in which he posed the pos-

sibility that the Navy may find the submarine its most effective weapon if wars come again.

With the coming of the V rockets and the inevitable improvements on them, air-minded military men and scientists who are concerned with the higher reaches of the atmosphere are thinking in terms which may parallel in their domain the developments under the sea.

Two Fields Similar

Strangely enough, the upper atmosphere and the subsurface, seemingly at opposite poles so far as the earth is concerned, are quite similar environments in many respects. Temperature, density, and wave variations are very closely related. The physical laws that govern the movement of sound in the two regions—the equations which inexorably dictate the details of these phenomena—are the same, though they may differ in magnitude. Much of the evidence for this was found during World War II.

Push-button warfare, winged missiles carrying atomic warheads thousands of miles, is not a likely prospect until the middle 1950's, Rear Adm. W. S. Parsons, deputy task force commander for technical direction, has stated.

Adm. Parsons said the upper atmosphere or the ionosphere—that part of the air from about 40 to 400 miles above the earth's surface—would be a major medium of warfare in any future world war. He pointed out, however, that much scientific research must be done first.

“You can be sure that when we can bounce radar signals off the moon,” Adm. Parsons said, “it is possible to penetrate all layers of the air envelope around the earth with radio waves. It is indicated, therefore, that we can send guided missiles through the upper atmosphere.”

Adm. Parsons, who recently was assigned to a Navy guided missiles program, added that the advantages in any future war to using an atomic bomb warhead on a guided missile make expenditure of large sums of money on research a military necessity. He said that the German V-2 rocket is not strictly a guid-

ed missile because control is lost after launching.

The lines that research in the upper atmosphere will take have been indicated clearly by scientists, prominent among whom is Dr. Joseph Kaplan, professor of physics at the University of California at Los Angeles.

Following on the heels of the German V-2 which recently ascended to an altitude in excess of 75 miles, robot rockets directed from earth will penetrate even farther into the ionosphere. Equipped with vacuum chambers opening automatically when low enough pressures are reached, they will sample the air at that level, collect it and return it to earth for chemical analysis. These samples may help determine among other things whether the earth is losing its atmosphere by dissipation into outer space. A spectroscope which permits the identification of elements in distant objects by spreading light received from them may be sent into the ionosphere in such a rocket.

Studying Cosmic Rays

Already under way is a Navy-sponsored project for studying cosmic rays in airplanes to 40,000 feet, which indicates the possibility of sending equipment into the ionosphere in rockets to study these rays.

Dr. Kaplan says that while only a beginning has been made on upper air research, there is a good nucleus of knowledge. The ionosphere lies above both the troposphere, extending about six miles above earth, in which weather occurs, and the stratosphere which reaches from six to 40 miles.

Even some knowledge of temperature is obtained with sound waves which are affected by changes in heat. More data on temperature are obtained from meteorites which are heated by friction with the air. This makes it possible to calculate air density and temperature at a height where meteors appear. Deadly ultraviolet radiations from the sun exist above the ozone layer which begins at 15 miles and extends upward 18 miles. Ozone stops these radiations from reaching the earth's inhabitants.

High in upper atmosphere the sky disappears and surroundings are completely black. The sky we see is actually nothing more than a scattering of the sun's rays by atmosphere. Great electrical storms rage through the ionosphere, usually during sunspot activity, creating flaming displays such as the aurora borealis.

Science News Letter, August 3, 1946

ATOMIC ENERGY

Fifth Atomic Bomb Blast

The underwater explosion could be likened to the bursting of a giant nova or to an enormous sea monster lashing in agony. But the bomb is a very real matter.

By DANIEL WILKES

Science Service Crossroads Correspondent
Wirelessed from Bikini

➤ THE GATES of hell yawned briefly across a peaceful stretch of the Pacific and then clanged shut with the fury of a thousand monsters and steaming radioactive water.

The fifth atomic bomb had been born and died—breaking surface like a Beowulf sea monster lashing in primordial agony at the sea and the test ships spaced neatly in the lagoon.

That was my first reaction to the underwater explosion of an atomic bomb viewed through binoculars. A column of water in brown colors hurtled into the air at a speed of 2,000 feet per second, followed by a breaking at the top. At the bottom were much greater billowing white and beige clouds, which spread quickly at first and then more slowly, hugging the sea surface. In a few minutes the central target area was obscured for perhaps a diameter of two miles.

The top cloud broke first into a dirty brown color, spreading into a luminous white mass which was soon lost in nature's clouds.

The underwater blast shook our ship slightly soon after the column appeared, followed about a minute later by blast and distant boom which rocked the vessel as though it had hit a high wave.

Within an hour the target area cleared, and nearly two hours later, the surface cloud, diffused but still visible, moved toward the horizon like a sickly fog hugging the sea.

While the Arkansas had gone down, the Saratoga, badly damaged, and other ships, were listing.

There was a water-cooled, cushioned fire of a hundred-million degrees at the center of the explosion. There were no dead people in the lagoon; none were dying which deadly gamma radiation would have rendered us powerless to rescue. There were no raging fires which, like heathen suns, lighted Nagasaki and Hiroshima.

It was hard two hours later to hold

onto one's first reaction. Normalcy had returned to our ship, and the scene was much the same as it had been before the blast.

In a different magnitude, seeing the explosion of the atomic bomb was like watching from the safe distance of the earth a super nova explode in some great island universe a hundred-billion miles away.

To many watching men it was an impersonal spectacle of only transitory interest. But such a detached attitude toward the atomic bomb is unreal for it is a personal thing to every man. It can be aimed at him.

To appreciate the spectacle in the lagoon, the observer must don goggles of retrospect and project himself over 10 miles of peaceful Pacific into a holocaust where concussion, heat and deadly radiations are making a small area of earth as untenable as the surface of a nova in the distant sky. He must know the things which are unseen in a column of smoke and unheard in a distant boom.

When, through these goggles, he gains capacity to think in terms of a rain of such novae on his city, then he becomes quite sure that only by making the bomb a personal thing can its influence over the earth be interpreted.

See Front Cover

The picture on the front cover of this SCIENCE NEWS LETTER, which is a Joint-Army-Navy Task Force One radio-telephoto through Acme, shows the tremendous column of water and clouds rising out of the lagoon as the atomic bomb was exploded July 25. Crossroads officials would not disclose the identity of the closest ship shown in this view of the blast.

Science News Letter, August 3, 1946

GEOLOGY

Atomic Blast Proves Darwin Theory on Atolls

➤ DARWIN WAS right. His century-old theory, that coral atolls were formed by the growth of coral on the top of slowly submerging volcanoes, has been given positive support by seismographs that recorded the movement of artificial earthquake waves started by the first atom-bomb explosion, on July 1. Dr. R. M. Tripp, seismologist with Joint Task Force One, states that these waves



Joint Army-Navy Task Force One Radio-Photo through Acme

"OLD SAILOR" DIES—The historic aircraft carrier Saratoga flashes her big "3" in the bright Pacific sun before vanishing under the surface of Bikini lagoon. An atomic bomb has accomplished what Japanese forces tried vainly to do during World War II. Still visible in the foreground is the peak of the ship's mast.

were reflected in a pattern showing that the atoll consists of a mass of coral 7,000 or 8,000 feet thick, on top of a solid mass of rough rock.

A rival theory, that atolls were built by coral growth on top of flat submarine

platforms, is apparently knocked out. The seismic waves did not come back up as they would have if they had been reflected from a flat surface of underlying rock.

Science News Letter, August 3, 1946

MEDICINE

Facts On Plasma Rumor

Fear that diseases are spread by blood plasma collected by Red Cross unwarranted. Experts prove that risk is very slight.

➤ YOU MAY have been hearing alarming rumors about diseases being spread to men in the armed forces and even to civilians through the blood plasma collected by the American Red Cross during the war and now being collected for civilian needs.

You need not be alarmed by these rumors. The risk is very slight. Here are the facts:

An occasional lone lot, or more often, a lone bottle, of dried plasma has contained some element, probably a virus, that is thought to be the cause of a kind of jaundice called homologous serum jaundice. A person getting this may develop jaundice one to three months after the transfusion.

This same material might be in any blood or blood plasma used for transfusions. Doctors first became aware of the situation during the war. Similar cases of jaundice have been seen following use of convalescent serum in measles and mumps and yellow fever vaccine when that was made with human blood serum. The yellow fever vaccine is now made without human serum.

The jaundice is very occasionally fatal.

Common disease germs are completely eliminated in the processing of blood plasma for the Red Cross. Tests are made of donated blood to rule out any carrying the spirochetes of syphilis.

Donors are selected and their blood taken for the Red Cross according to rigid, never relaxed standards set up by the Army Medical Corps. These standards provide both for the safety of the blood and the safety of the donor. A history of recent illness or an anemic condition which would make the blood of poor quality and would involve a risk to the donor are looked for.

When the rumors about disease being spread by Red Cross blood plasma started, the Red Cross called a conference of representatives of the U. S. Public Health

Service, the Army, the Navy, the National Research Council, the blood fractionation laboratory at Harvard Medical School, and physicians and surgeons experienced in the field of blood transfusions. The rumors had gone so far that the State of New Jersey had refused to go along with other states on the new policy of Red Cross plasma distribution for civilian use.

The conference of experts, after considering the matter carefully, advised the Red Cross to continue to distribute blood plasma. The risks were so slight, these experts decided, and the occasional bad effects so rare that there was no reason for the Red Cross to change its policy of making plasma available to civilians after requirements of the armed forces had been met. This recommendation was made with the provision that doctors should understand when they use plasma that there is an element of risk, although that is true of any medication that may be given a patient.

New Jersey and all state health departments are now getting the surplus plasma and doctors are using it. State health departments are responsible for distributing it to doctors, hospitals and to stations or depots where it is available for use in case of disasters. Since the blood is donated to the Red Cross, no charge may be made for it.

Science News Letter, August 3, 1946

ECOLOGY

Bikini Not Hollywood Type of Paradise

➤ AN ISLAND in the Dry Tortugas off the tip of Florida might give a fairly good idea of what the vegetation of a Pacific atoll such as Bikini looks like. It's all very hard on the glamorous visions made in Hollywood of lush glens full of tree-ferns, orchids and shy, brown-skinned maidens in sarongs.

That belongs, if anywhere, on larger islands like Samoa, where there is more soil. Life for tree and human beings is anything but easy in the low-lying, thin-soiled, scant-moistured Micronesian isles.

Native vegetation of all the Marshall Islands atolls follows a uniform, rather monotonous pattern. On the windward side of any island or islet there is an impenetrable thicket of tough-stemmed, hard-leaved bushes and trees forming a kind of natural barrier against the almost incessant wind. In the lee of this, the plant community opens out a bit forming what is called "dry forest." The trees and shrubs have the same hard, harsh leaves that we see in our own Southwest—or on our own beach dunes.

Science News Letter, August 3, 1946

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AERONAUTICS

Jet Plane Carrier Landing

Navy's fastest jet plane makes successful test landings on aircraft carrier, proving that propellerless aircraft have future in the Navy.

► THE NAVY'S fastest airplane and one of the fleet's biggest ships teamed up recently in a preview of future Naval air power as the first jet plane landings on an aircraft carrier were made while the giant FDR steamed into the wind 60 miles east of Cape Henry, Va.

The sleek, bullet-nosed McDonnell Phantom, FD-1, whistled down to five successful landings on the big carrier's flight deck in the historic test flights.

With an announced top speed "in excess of 500 miles per hour," the single-seat Phantom became the first propellerless plane to land on a U. S. Navy carrier. Now in production for the Navy, the Phantom is designed as an interceptor and has a range of approximately 1,000 miles.

Unlike rockets, the twin axial-flow Westinghouse turbo-jet engines that power the Phantom spray back heat but no flame. Unlike conventional carrier planes, virtually no warm-up is required and the Phantom is ready to take off almost as soon as the engines are started.

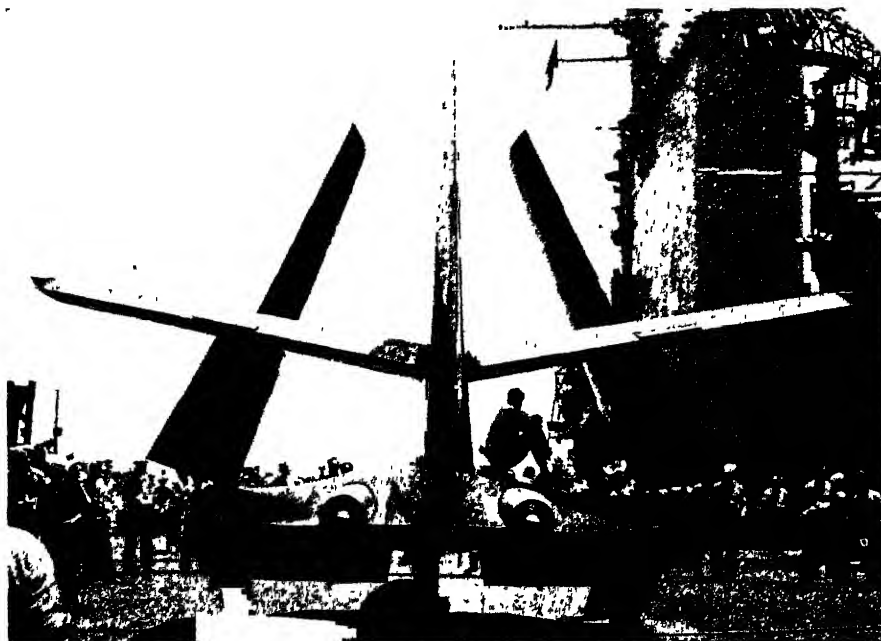
Lt. Comdr. James J. Davidson, test pilot for the plane since the Navy began trials with it, says that the Phantom loses or gains speed less rapidly than conventional Navy planes but is easier to handle. He reported that the high-speed plane climbs rapidly and, with no propeller, gives the pilot better visibility and quieter flying without the torque caused by the motion of propellers.

Carrying test instruments on the carrier flights, the Phantom weighed 8,800 pounds compared with a fighting weight of more than 9,200 pounds.

Navy photographers and other technicians lined the deck of the Navy's newest large carrier gathering data on the flights, while cameras in the plane recorded instrument readings during the five tests.

After the successful flights, Capt. C. E. Giese, head of flight testing at Patuxent, Md., Naval Air Station where the Phantom was first flown by the Navy, predicted, "Jet aircraft have a great future on Navy ships."

Science News Letter, August 3, 1946



FOLDED PHANTOM—The Navy's fastest plane on the flight deck of the giant Franklin D. Roosevelt before spreading its wings to take off for the first jet plane landing on a carrier.

MEDICINE

Rare Type of Diphtheria Found Among Soldiers

► A RARE type of diphtheria has been brought to the United States by soldiers returned from the overseas theaters with skin diseases. A new problem of disease control has been created in Army hospitals.

The diphtheria differs from the common throat infection in that the diphtheria germ enters the skin through a wound or sore, and attacks the nose, throat, and ears, as well as the skin.

Virulent diphtheria germs were found in 1/20th of the patients sent to an Army hospital because of skin infections acquired in a tropical area. Nearly half of the other patients and workers in the skin disease wards were found susceptible to diphtheria, as measured by the Schick test.

A plan to check the spread of wound diphtheria has been reported by Maj. Eric Denhoff, Lieut. Maxwell Kolodny, Col. Worth Daniels, and Capt. Landis Mitchell, of the Army Medical Corps. Careful examination of incoming patients, isolation and quarantine of diphtheria patients, and Schick tests for all patients and workers are recommended, especially for hospitals caring for patients with skin diseases.

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WILDLIFE

Spring-Powered Harpoon Gun for Fishing

► SPORTSMEN who go in for spearing fish have a new weapon offered them in a spring-powered harpoon gun, on which G. O. Potter of Waubun, Minn., has been granted U. S. patent 2,404,249.

The short spear, with its barbed tines, is shoved into a pistol-gripped stock, compressing a strong coiled spring until a notch engages a dog actuated by the trigger. When the trigger is pulled the released spring drives the spear hard at its swimming target. Behind it trails a line to a reel on top of the stock, which enables the fisherman to haul in the fish.

This weapon can presumably be used also against fish that will put up a fight after being speared, like muskellunge in northern fresh waters, or barracuda and shark along the seacoast. For this purpose, of course, a good-sized reel carrying a long line would need to be mounted.

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CHINESE TYPEWRITER—This International Business Machines Electro-Automatic Chinese typewriter was designed at the suggestion by a Chinese engineer of a practical method by which the need for such a typewriter might be filled.

PHARMACY

Sleeping Pill Law Asked

► HAVING a bottle of sleeping pills of the barbiturate class in your pocket or medicine chest, unless they were prescribed for you by a doctor, would make you liable to fine or imprisonment or both, under a law proposed by the American Pharmaceutical Association. Veronal, luminal and amytal are some of the names under which these drugs are sold. Like doctors and other professional groups, the pharmacists of the nation are "dismayed" at the misuse of this class of drugs, a misuse for which the professional groups claim they are not responsible.

Very useful when prescribed by a physician, these drugs are dangerous when used without medical supervision and have been responsible for numerous suicides.

The proposed law making possession of the drugs punishable was drawn up for submission to state legislatures as a step toward control of underworld and illicit use of barbiturates. More satisfactory control can be achieved by uniform state regulation than at the Federal level, it is believed by the pharmacists.

A wide variation and coverage in present state laws was found in a survey published in the *Journal of the American Pharmaceutical Association* (July). The following 12 states have no laws governing sale of barbiturates: Arizona, Idaho, Illinois, Iowa, Kentucky, Massachusetts, New Mexico, Ohio, South Dakota, Texas, Wisconsin and Wyoming.

The U. S. Food and Drug Administration has jurisdiction over barbiturates that have been in interstate commerce but provisions for Federal control are not adequate, pharmacists point out.

Science News Letter, August 3, 1946

ENGINEERING

First Practical Chinese Typewriter Built

► ELECTRO-AUTOMATIC Chinese typewriter, the first ever built, contains a typeface cylinder upon which 5,400 Chinese type faces are engraved. The cylinder is electrically operated by 43 keys. Thirty-six numerical keys are divided into four groups, and any of the Chinese characters can be put into printing posi-

tion by striking one key in each group.

The machine is American-built and is a product of the International Business Machines Corp. of New York. In addition to the Chinese type faces, it is provided with an English alphabet, numerals, punctuation marks, and 40 Chinese phonetic characters for auxiliary purposes.

The electro-automatic Chinese typewriter can be used as an office typewriting machine, and can also be used as Chinese telecommunications equipment. Since the number system is already universal in China, this typewriter may be automatically linked up with all existing equipment in these related fields.

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RESEARCH

Stalin Prize for Physiology Study

► THE STALIN prize has been awarded to Dr. Maria Petrova, leading woman physiologist of the U.S.S.R. who was Pavlov's principal assistant.

During the war in besieged Leningrad, she continued researches upon conditioned reflexes in animals, although she suffered extreme hunger and cold and sometimes lacked bare necessities. Studying the effects of air raids and shellings upon the nervous system, she contributed to the understanding of the physiology of war neuroses.

Another leading research by Dr. Petrova proved the curative value of bromides for certain kinds of neuroses. Now over 70, Dr. Petrova is studying how disorders of the nervous system stimulate cancer and the relation between the nervous system and old age.

Science News Letter, August 3, 1946

MEDICINE

Camphor May Increase Production of Penicillin

► CAMPHOR is seen as a possible aid to increased production of penicillin.

Scientists at the University of Manchester have succeeded in creating, by treatment with camphor vapor, giant spores of a penicillium strain now used in making the drug. Even though the experiments, as reported by Dr. Eva R. Sanome in the British scientific journal, *Nature* (June 22), have caused no immediate increase in penicillin, future research with camphor and other strains of the mold may expand its production.

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ARCHAEOLOGY

Wall of Antiquity Found

A great wall recently discovered in Paraguay, with its ancient carvings, may be clue to a prehistoric race who left no other trace of their culture.

By MARJORIE VAN DE WATER

➤ A GREAT wall, 4,500 feet in length and at least 120 feet high, hidden for countless years within the heart of a mountain ridge, Cerro Cora, in the north-eastern part of Paraguay, may hold the secret of a past civilization.

This wall, judged by engineers to be an excellent work of engineering, is built of great blocks of red granite polished to a high luster on the face of the stone. On this polished face appear, it is reported, drawings portraying animals and footprints, both animal and human, and many signs which may be hieroglyphics. The blocks fit together with perfect precision.

The Indians of the region have no knowledge of the origin of this work. They have no tradition to give a clue as to the builders and what was their purpose.

Maj. Marcial Samaniego, director of the Administracion General Arqueologica, now charged with the care of this important antiquity, expressed the belief that both the wall and the carvings may have been the work of the Guaraní Indians in prehistoric times.

If so, or if it is a monument of a still earlier people, the Guaranano, the discovery has great significance to archaeologists, for neither of these great tribes left behind a single material trace. The Guaraní were reported to be great agriculturists and are credited with giving the world such important products as corn, tobacco, sweet potatoes and pineapple. But they built their houses, if any, of perishable materials—perhaps the same adobe and straw used in the country regions of Paraguay today—and nothing has ever before been found in all this section of South America to indicate what kind of culture they may have had.

Now practically extinct, this numerous tribe has thus left nothing as a heritage but a little folklore and their language, which is today the everyday language of the Paraguayan people.

Who built this wall? With what tools were the great blocks moved and the stone polished? Who put the "handwriting" on the wall and what is the significance of the signs? How did the moun-

tain ridge get in place covering the wall, or how was the great wall placed within the ridge?

These are some of the questions awaiting the arrival of scientists to study this site. Certainly the ridge has been right there during all historic times. It has a special historic meaning because it is the site where the war President Mariscal Lopez fell mortally wounded, leading his people in a war which cost the nation of Paraguay half the male population of military age.

Recently, a part of the ridge fell away, revealing the face of the wall with its undeciphered messages. The wall was first noted by Frederico Berger, a military man without special scientific interest, and later has been partly cleared and observed by the amateur archaeologist-engineer now charged with its care, Maj. Samaniego.

In the same general region with the wall, but in a completely separate place has also been found a trench formed also of two walls of stone. This trench is completely filled and sealed with ceramic clay. No one knows what lies hidden within.

Another object which may or may not have archaeological importance is a stone similar in appearance to a dolmen of gigantic size.

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NUTRITION

In-Plant Feeding Aids Workers in Factories

➤ A GOOD breakfast and between-meal snacks will greatly reduce a worker's chance of accident in industry, Miss Alice Zabriskie, industrial feeding specialist of the U. S. Department of Agriculture, told the American Home Economics Association meeting.

Pointing out that more industrial mishaps to workers occur before 11 a. m. than after noon, she declared that nutritious breakfasts can cut the number of accidents by 25%.

Miss Zabriskie urged industry to adopt regular in-plant feeding programs, and she reported that some companies have not only reduced accidents but also have

increased production by giving workers pints of milk or other nutritious snacks between meals.

Estimating that 60% of industrial workers need in-plant feeding facilities, she said snacks could increase efficiency, build morale and improve labor relations, cut the number of accidents, reduce turnover and save time.

One survey in an Indiana plant that served food showed that workers not only ate better food at work but 24% of them thought that they had improved their nutritional habits at home as a result of the program at work.

"Industrial feeding is recognized by plant management in the postwar period as an integral part of industrial organization," Miss Zabriskie said.

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PUBLIC HEALTH

Dishwashing Compounds Tested in New Method

➤ THE SPREAD of disease by dishes and silverware in public eating places may be slowed down by the U. S. Public Health Service's newest method of testing dishwashing compounds.

Since germs are harbored in greasy, hard water films and particles of food, a plate or fork cannot be sterilized, even with steam or chemicals, until it has first been properly cleaned.

Restaurants, bars, and dairies, using common cleaning compounds, can learn which ones are most effective through this new laboratory test developed by Edward H. Mann, assistant sanitarian, and C. C. Ruchhoft, principal chemist, of the U. S. Public Health Service.

Glass slides substituting for dishes in the test are covered with a special dirt mixture, then baked, examined, washed, rinsed, dried and re-examined. Since the human eye is not sensitive enough to detect and grade the amount of dirt remaining on a utensil the scientists used a photometer. Like the "electric eye" used in opening doors, the photometer is sensitive to light and dark areas. After passing through the washing machine, the dishes are again examined with the photometer, and the cleaning compounds used are graded for their efficiency.

The special dirt mixture used for the test is made of peanut butter, butter, lard, flour, dried egg yolk, evaporated milk, water, India ink, printing ink diluted with boiled linseed oil, a copper compound and sodium hydroxide.

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ANIMAL HUSBANDRY

Blue or Green Tattooing Marks Sheep, Horses

► THE LEGENDARY monopoly of tattoos by sailors may be broken by sheep and horses with the report of successful experiments with colored tattooing to mark the animals.

C. E. Allen, associate chemist for the Dominion Department of Agriculture in Ottawa, Canada, reports that blue or green tattoos have been found to be a good permanent identification for two breeds of sheep and one breed of horses tested.

Horses are tattooed inside the lower lip, and the sheep are marked on an ear.

Colors were used for the tattoos after earlier use of black marks were found in some cases to become illegible. A lamb tattooed in black might be found to have a black ear when it matured, so colors are now being used.

While identification of sheep with the colored tattoos has been found effective, Mr. Allen says that marking horses on the inside lower lip requires special considerations. The actual tattooing of horses is relatively simple with two men and the horse placed behind a wall or gate. A twitch is applied to the upper lip and closely spaced, short, pointed needles are used.

Green and blue compounds have been found non-toxic, and a concentrated paste form of tattoo compound is used for the horses. No astringents or protective coatings are necessary, but the compound must set quickly.

Clydesdale horses were used for the experiments, but Mr. Allen believes that the tattoo identification on the lip will be satisfactory for all breeds.

Science News Letter, August 3, 1946

MEDICINE

Polio Death Rate Steadily Declining

► THE DEATH rate from infantile paralysis is on the down grade. This news, especially cheering now while cases throughout the nation are mounting, comes from Metropolitan Life Insurance Company statistics covering one- to 14-year old children insured by that company's industrial department.

The standardized death rate for 1945 was less than two per 100,000 whereas in 1911 it was over five per 100,000. During the 1916 epidemic it rose to 36.8 and

in 1931, another big polio year, it was over six per 100,000.

Girls have benefited more than boys from the improvement in polio mortality among white children. From 1941 to 1945 the death rates for girls were on the average half those for boys.

The saving in lives has been greatest among children under five years. The peak of mortality now is at ages five to nine among white boys and 10 to 14 among white girls.

The improvement in the polio death rate is all the more significant because during the 35-year period physicians have increased their ability to diagnose the disease and a larger number of cases are being correctly reported.

Whether the decline in the death rate is due to fewer cases of the disease or to better treatment having saved more of those who got sick or both is hard to determine.

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CHEMISTRY

Chemical Draws and Holds Moisture From the Air

► HOMES in humid climates may now be comfortable with a new chemical that picks up the moisture from the air. A few beads of the material in a salt shaker will keep the salt from caking. A handful in a toolbox will prevent rusting. Its greatest value, however, is in industrial applications. It can maintain low humidity in warehouses, storerooms and holds of ships. Already it has been applied to ship protection. Air, dried with it, is pumped through pipes to vital parts of idle war vessels to keep machinery and equipment in condition. It has particular value where grain, furs, textiles, lime and cement are stored.

The new material, technically a desiccant, is a product of Socony-Vacuum Oil Company, Inc., and has been named S/V Sovabead. It consists of spherical beads of uniform size. Each bead is honeycombed with microscopic pores that draw and hold moisture from the air, and is capable of adsorbing up to 40% of moisture. When saturated, it can be dried out by heating at 300 degrees Fahrenheit, and used over and over.

As compared with silica gel, the commonly used desiccant, the new material is extremely hard and durable, and does not become powdered to a fine dust. It can be used open in a room, or in an air-conditioning unit to dry the air as it passes through.

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IN SCIENCE

BIOCHEMISTRY

Inorganic Plastics Resist Fungus Growth

► FUNGI grow on some plastics and not on others because of the organic material in the plastics. Wartime research by the Bakelite Corporation and Boyce Thompson Institute, under contract with the Office of Scientific Research and Development, showed that the inorganic components resist such growth.

The lubricants of animal or vegetable origin support fungus growth. Fungi do not grow on synthetic phthalate, vinyl resin, phosphate plasticizers, and inorganic components. Twenty of the 32 test cultures included tropical fungi. Of the fungus preventives tested, a top-quality, moisture-proof varnish was found to protect phenol-formaldehyde cotton-base laminates as well as any of the fungicidal finishes.

Science News Letter, August 3, 1946

INVENTION

Strut Invented to Anchor Helicopter

► HOLD-DOWN device for helicopters, a type of equipment essential for planes with horizontally rotating propellers if building roofs and rolling ship decks are to be used for landing platforms, has recently been patented.

The device is a strut that can be extended, at will by the pilot, below the plane to engage itself, by means of barbs on its end, with one of the many openings in a grill fixed in the landing area. When ready to take off, the pilot operates controls that automatically retract the barbs and release the craft. Then the device is withdrawn into the body of the plane.

Automatic means are provided in the device for contracting the strut as soon as it engages the grill so that the plane is held tightly to the platform. One particular advantage of the invention is that it is able to hold a plane securely when the rotors are driven preparatory to a take-off.

Harold F. Pitcairn, Bryn Athyn, Pa., received patent 2,403,456 for this invention, and he has assigned it to Autogiro Company of America.

Science News Letter, August 3, 1946

THE FIELDS

PHYSICS

Largest Van De Graaff Atom Smasher Being Built

➤ AN 8,000,000 electron volt Van de Graaff accelerator for use in atom-smashing is being designed at the University of California's atomic bomb laboratory.

The machine will be the world's largest practical operating voltage Van de Graaff generator. Highest known practical operating voltage for one of these machines is 4,000,000 electron volts, which was the energy achieved by the University of Wisconsin's accelerator when it was being used at the Los Alamos laboratory. The Wisconsin machine was recently returned.

A midjet generator is already being constructed for testing materials and assembly techniques, and a pilot generator will be constructed later in the year. Building of the 8,000,000 volt atom-smasher will begin next year.

Dr. Joseph L. McKibben is the nuclear physicist in charge of the machine, which has been authorized by the Manhattan Engineer District.

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ANTHROPOLOGY

Ape-Man's Front Tooth Spacing Causes Debate

➤ BECAUSE *Pithecanthropus IV*, most recently found of the Java ape-men, found it easy to pick his front teeth, two leading American anthropologists are having a lively though friendly argument, conducted in the pages of the *American Journal of Physical Anthropology* (June).

This skull is the only one of this ancient humanoid species that has its upper teeth in place. Between the outer front teeth and the eyeteeth there is a little space.

Dr. M. F. Ashley Montagu of the Hahnemann Medical College, Philadelphia, regards this as an evolutionary link with the great apes, which have a noticeable gap in this position to accommodate the tip of the huge canine tooth jutting up from the lower jaw. In these apes this space is known technically as the diastema. Presence or absence of the diastema

is one of the things used in classifying the animals and determining their names.

Dr. Franz Weidenreich of the American Museum of Natural History in New York disagrees. He says the space in the *Pithecanthropus IV* skull does not justify setting this specimen apart from other Java ape-men as a separate genus. Not all great apes have diastemas, anyway, he declares: female orang-utans lack them, though their mates have them.

Probably the only way this debate can be settled will be by going out to Java and digging up some more *Pithecanthropus* skulls. As soon as things settle down over there this is likely to be done.

Science News Letter, August 3, 1946

ENTOMOLOGY

Grasshoppers May Prove Help In Grain Field

➤ FARMERS fighting off grasshoppers busily devouring the leaves of well-developed plants, leaving only bare stems with heads intact, will be surprised to learn that these greedy hordes can be a blessing in disguise.

While stripping the growing plants of leaves, during heading out and blooming, cuts down the grain to be harvested and its weight per bushel, loss of leaves just before the grain ripens may actually increase the total harvest. R. M. White, entomologist of the Dominion Entomological Laboratory at Lethbridge, Alberta, found.

To get an idea of the destruction caused by grasshoppers invading wheat fields, 'hopper damage was simulated in 12 of 15 plots of wheat, the other three being left as checks. In the first two plots the plants were cut off at ground level as soon as the plants were ½ to 1½ inches high.

Leaves were removed, leaving the main stems intact, from plants in the remaining plots in successive weeks. Each plot received the one defoliation only and was left untouched for the remainder of the season, as would happen if an invasion had been controlled at that time and the 'hoppers did not return.

Plants that had been defoliated were all slightly shorter than those of the check plots, Mr. White reported to the Agricultural Institute of Canada. The number of heads per plant was also greatly reduced when the leaves were cut from the plant during the second to the fifth week.

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VETERINARY MEDICINE

Relief for Animals from Pests and Parasites

➤ HOUSEHOLD pets, poultry and farm animals may be happier in the future because of materials developed during the past few years to rid them of both inside and outside parasites, Dr. R. E. Rebrassier of Ohio State University recently told veterinarians from six states.

Research has provided chemical and other weapons to cope with many of the most damaging parasites.

Some of the newer materials include DDT, mixtures of rotenone, a new remedy known as Formula M.S. 793F, cerbinol, hexachlorobenzene (666), phenothiazine and sodium fluoride, and also British developed gammexane.

"Gammexane, unlike DDT, appears to be quite effective in destroying mites," Dr. Rebrassier reports. "This new agent may prove useful in combating sheep and cattle scab, poultry mites, and various forms of mange in dogs and other animals."

Cerbinol is recommended for ringworm in cattle and foot rot in cattle and sheep, and also for moist eczema and ear canker in dogs. The 666 gives promise of being one of the best chemicals to rid the intestines of ascarids, common parasitic worm.

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BIOLOGY

Water Temperature Effect On Shipwreck Victims

➤ ONLY A FEW shipwreck victims, if any, could survive immersion for more than one hour in water as cold as 30 degrees Fahrenheit. At higher temperatures, men can survive longer and at temperatures of 68 to 70 degrees immersion of 60 hours or perhaps longer could be survived.

These figures appear in a report by Dr. G. W. Molnar, of the University of Rochester School of Medicine and Dentistry, in a report in the *Journal of the American Medical Association* (July 27). They were obtained from reports of rescues at sea in the files of the Navy's Bureau of Medicine and Surgery.

Ability to survive immersion in water at temperatures below about 68 degrees Fahrenheit is limited by the loss of body heat at a rate which exceeds heat production, Dr. Molnar states.

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PHYSIOLOGY

"Explosions" in Wounds

High-velocity bullets cause explosions in wounds, the intensity of which breaks bones. Research into this solved a wartime medical problem.

By FRANK THONE

➤ MOST of the wounds suffered during the war have healed by now. A lamentable number of young men will have to go through life minus a leg or an arm. The number of amputees would have been even larger, however, but for some research conducted during the war on the nature of wounding by high-velocity missiles, and only now being disclosed to the general public.

Military surgeons have long had a pretty good idea of the nasty injuries that can be inflicted by jagged chunks of flying metal from such missiles as artillery shells, airplane bombs and hand grenades. Land mines were something new to the recent war, but they were not unlike explosion injuries often sustained in such hazardous trades as mining and quarrying.

There was a tendency, though, to be a little bit complacent about bullet wounds. The bullets used in modern military rifles and machine guns, much smaller than the old-fashioned lead slugs

they replaced a half-century ago, covered moreover with harder metal, were supposed to make "nice, clean wounds."

But the hard facts of war did not bear out this optimistic notion about the humaneness of high-velocity, jacketed bullets. The wounds were often slow in healing. Moreover, a wound in arm or leg frequently showed a broken bone, though the bullet had not passed anywhere near the bone. The patients also often showed symptoms of shock, much more profound than a "nice, clean" bullet should have caused.

What was the matter? That was what a four-man research team in the physiology laboratories at Princeton University set out to discover. The team consisted of Prof. E. Newton Harvey, Prof. E. G. Butler, Dr. J. H. McMillen and Dr. W. O. Puckett.

Two relatively new pieces of scientific apparatus made their research possible. One is the ultra-high-speed motion picture camera, which takes thousands of frames in a second instead of the conventional 16 of ordinary cameras. That

would show what happened on the outside of the target when the bullet struck. The other is the microsecond X-ray apparatus, for which the exposure is a millionth of a second. That would get pictures of the target as the bullet struck, as it passed through, as it went on out the other side.

Obviously, human arms and legs could not be used in the experiments. Volunteer human guinea pigs will cheerfully let themselves be half starved, will swallow deadly germs, will take staggering electric shocks, in the cause of medical science. But asking a man to stand up and get shot in the leg is something else again.

Stray dogs and cats, already ticketed for the gas chamber anyway, were drafted as substitutes. Even they were not shot while alive and conscious. They were given doses of a well known sleeping drug—doses so heavy that they would never wake up again. Then, just as the faltering heart-beat told that life was passing out, one leg would be placed in front of the muzzle of a rifle on a fixed stand and the test shot fired. An electrical connection to the motion-picture or X-ray camera would insure exposures at just the right hair-split fraction of a second.



WOUND PROBLEMS—Ordinary X-ray shots of a test animal's leg before (left) and after (center) a high-velocity pellet had been shot through it show how the bone has been broken by pressure changes even though some distance from the bullet hole. The picture at the right is an X-ray taken with an exposure of one millionth of a second and shows the temporary cavity made when a high-velocity shell fragment hits.

The bullets used in these experiments were scaled down to the size of the flesh-and-blood targets at which they were fired. They were eighth-inch and three-sixteenth-inch steel balls, and small cylindrical slugs of comparable size, fired from a specially mounted rifle barrel at velocities around 3,000 feet a second.

The super-speed motion pictures of the outside of an animal's leg showed that just after the bullet had penetrated there was a sudden bulging of the tissues along its path. This bulge came and went so quickly that the human eye could not discern it. Postmortem dissection showed considerable damage and disorganization of the tissues in a very large area around the missile's path, and very likely a broken bone.

When the test was repeated before the millionth-second X-ray camera, it could be seen that when the bullet hit, the tissues leaped away from it in every direction, leaving an empty space for a minute fraction of a second. Blood vessels and nerves were pushed violently aside, often with rupture of the trunks. The break in the bone could be seen.

It was very much as if a pinch of TNT had been planted inside the limb and then detonated. It explained the wide areas of messed-up tissue around high-velocity bullet wounds, and certainly indicated that there is no such thing as a "mere flesh wound"—at least when the injury is inflicted at close range. Low-velocity missiles do not produce these explosive effects.

To get a simplified picture of what goes on when a high-velocity bullet strikes, Prof. Harvey and his colleagues fired similar missiles into water, and into blocks of gelatin. When the bullet struck either water or gelatin, there would form a V-shaped wake of rarefied air behind it. In an instant this would contract and clump itself into an irregular cavity, which would go through several writhings and contortions before it would disappear. So much energy was given off by the projectile in producing this effect that in one instance a block of gelatin jumped four feet into the air after the steel ball had passed completely through it.

The shots into water showed another thing very clearly. At the instant of impact, a compression wave started through the water, and kept ahead of the bullet as it penetrated. Where it struck the surface, it started a second, or reflection wave. All this shows up on the photographs, with the wave fronts clearly marked by shadowy arcs. It all looks very much like the diagrams that seismologists draw of earthquake waves moving through the interior of our planet.

Results of the whole study were made available to surgeons in the armed forces, and to the medical profession generally. They did much to improve the treatment of short-range bullet wounds, and the quite similar effects found in wounds caused by high-velocity steel splinters from exploding shells and bombs.

Science News Letter, August 3, 1946



HOME RECORDER—Radio programs, speeches and greetings to friends may be recorded on paper tape in this set designed for home use.

the more true to life the voice sounds. When almost eight inches of tape pass through the recording-reproducing mechanism each second, music and people's voices sound as natural coming from the recorder as when coming over a good radio with a ten-inch speaker.

The magnetic tape works in much the same manner as magnetic wire. The amplifier converts the sound of a person speaking into the microphone into electric impulses which vary in tune with the sound vibrations. These electric impulses produce equivalent vibrations in the magnetic field of the machine, which impulses are in turn recorded on the moving tape. The process is reversed for play-back. The magnetic pattern on the wire is reconverted into electric currents which are in turn converted into sound through the machine's amplifier and speaker.

Magnetic tape recording was developed during the war under the auspices of the Office of Scientific Research and Development by the Brush Development Company which, even before Pearl Harbor, had begun investigating this type of device. When American Army technical men went into Germany, they found that there had been a parallel development in Germany during the war. This has since been exhibited in the United States.

Science News Letter, August 3, 1946

PHYSICS

Voice Recorded On Paper

Easy-to-handle magnetic tape records human voice, radio programs, etc. Reproduction is obtained by reversing the process.

➤ PAPER STRIP coated with iron oxide is the latest device for sound recordings. This magnetic tape, simple and easy to handle, promises to be the favorite sound recording method because of its cheapness.

In the home it will preserve radio programs, family discussions and baby's first words. Recording of a timeless symphony can be retained indefinitely while swing music can be played back for a while, then erased and the tape used again. This light-weight paper tape can be used to play back one recording as many as 1000 times. Or 500 different programs can in

turn be recorded and played back just once.

A quarter-inch wide, the magnetic tape has sufficient body to handle easily. Should it break in use, there is no backlash to snarl the ends. The broken ends can simply be pasted together and it is ready for use. Magnetic wire, on the other hand, is almost as fine as a human hair and once broken is difficult to thread back into place.

The fidelity of the recording depends largely on the rate at which the tape is run through the recording-reproducing mechanism. The faster the tape moves,

At the present increase in the American thirst for *milk*, by 1950 consumers will require 24% more milk than they did before the war.

Do You Know?

Tomatoes were eaten by the Incas of Peru centuries ago.

Stow-away beds, with magnesium frames, are promised for sleeping cars; magnesium is used to give them lightness.

Citric acid is produced now mainly by mold fermentation instead of from citrus fruits; its principal uses are in soft drinks, confectionery and medicine.

Natural rubber demand will exceed the supply until full production is reached again; later the demand may be less than production capacity.

There is enough gold in the oceans to give each of the 2,000,000,000 inhabitants of the earth \$15,000 worth, but the cost of obtaining it is more than this amount.

An easy way to apply DDT to hens to control lice, rat fleas and bedbugs is to scatter a 10% DDT dust on the litter on the poultry house floor; as the hens scratch, they throw the dust into their feathers.

Japan, with little domestic coal for heating or cotton or wool for clothing, must now rely upon its extensive forests for fuel, construction materials, and as raw material for rayon for garments and other purposes.

Bakers' cheese can now be made from dried skim milk, instead of from the liquid form; the product can be made near the bakeries where it is to be used, obviating the heavy transportation and freezing costs incurred when liquid skim milk is used.

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AERONAUTICS

Safe Aviation Fuel Wanted

Crash accidents have proved need for non-vaporizing, high-octane gasoline for aviation. Wartime developments too costly for civilian use.

➤ **WANTED:** a safety fuel for aircraft—one less liable to cause fire within engine housings or explosions in crash-landings.

Some types have already been developed. Scientists had produced before the war what they called a "safer high octane aviation gasoline." A still safer product will probably soon appear.

The war directed attention to other projects, but it has swung back again. The problem now is the improvement of the prewar fuel, the development of economical manufacturing methods, and the adaptation of engines so that it can be used.

Just a year ago, the Standard Oil Company of New Jersey publicly demonstrated an aviation fuel developed by it that is so resistant to accidental ignition that a lighted match can be dropped in it without causing a fire.

The safety feature of this gasoline is the fact that it does not form inflammable vapors in the air in great enough quantity to ignite, unless it is at temperatures above 100 degrees Fahrenheit. Ordinary motor and aircraft gasolines do, and they ignite readily and burn rapidly because of the vapors formed.

This safety fuel is much like kerosene. Kerosene, the world over, is regarded as a safe fuel because it does not vaporize dangerously until heated to 100 degrees or over. This is one advantage in the use of kerosene as fuel in jet-propulsion planes.

One disadvantage of the fuel demonstrated is that it must be fed into engines by direct injection rather than through ordinary carburetors. Unless suitable carburetors are developed, engines now in use will have to be converted for fuel injection if the new gasoline is to be used.

The demand for safety fuel, now much alive because of recent aircraft accidents, originated at least two decades ago. The Standard Oil Development Company has long worked on the problem. The object was to make a fuel with the power characteristics of 100-octane but which would be as safe as kerosene.

Scientists had little difficulty in raising the flash point of aviation gasoline, but

they encountered a serious problem in lowering the volatility so that it would not vaporize easily. When they succeeded, some was produced for experimental purposes, but the cost was very high. It was produced by the then new hydrogenation process.

Manufacturing methods were improved later, and the new safety fuel was used by the Navy in testing fuel lines, pumps and fuel tanks on airplane carriers. Leaks could be located without danger. The Army also tried the fuel in airplanes but found it unsatisfactory in combat for reasons that would not apply at all in commercial aviation.

Science News Letter, August 3, 1946

INVENTION

Heat Process for Peeling Vegetables

➤ **POTATOES**, carrots and other vegetables can be peeled in great quantities, for dehydration, canning or other processing, by brief exposure to high radiant heat, states a U. S. Department of Agriculture scientist, George T. Hemminger of Berkeley, Calif., in his preamble to patent 2,403,923. The heat literally cooks the skins off them, leaving the rest of the flesh unaffected.

His invention is an oil-heated, brick-lined furnace, through which the vegetables are rolled by a spiral fin mounted on a long cylinder. Their rate of travel is so adjusted that they get just the right amount of heating-up to peel them properly.

Rights in the patent are assigned royalty-free to the government.

Science News Letter, August 3, 1946

RADIO

Miniature Radio Doubles As Radio and Watch

➤ A **VEST-POCKET** radio receiving programs from a special short-wave station is the latest postwar broadcasting development. The new radio, half the size of a package of cigarettes, will double as a radio and watch, with time reports being received at regular inter-

vals 24 hours a day from the new station.

The Federal Communications Commission will soon hold hearings on the applications of Electronic Time Inc. for the 2-kilowatt station to be operated on 25 to 30 megacycles. The station, with a broadcasting radius of only 25 miles, will be operated atop the Lincoln Building in Manhattan, if the commission approves the request.

The fixed frequency receivers are expected to be a boon to blind persons, replacing braille watches with time

announcements on them

It is planned that the new station will also carry news reports and weather forecasts. If the trial here is successful, Electronic Time Inc., hopes to be able to establish a nation-wide service.

In addition to the vest-pocket receiver, desk and home sizes are planned. The latter can be set up as an alarm clock to pick up the time signal at a predetermined time

Numerous military applications are forecast for the new receiver.

Science News Letter, August 3, 1946

MEDICINE

New Attacks On Virus

Thyroid gland extract, local and general anesthetics, may be possibilities in future treatment of polio, encephalitis and other virus-caused diseases.

►WHEN INFANTILE paralysis epidemics break out at some future date, children may get doses of thyroid gland extract to protect them from the disease. Older people might get a thyroid-slowng drug, thiouracil.

If anyone does contract the disease, he might be saved from painful muscle spasm and paralysis by injections into nerves along the spine of a local anesthetic solution.

Or light sleep induced by ether or some other general anesthetic might become the future treatment for polio and such other virus-caused diseases of the nervous system as encephalitis, encephalomyelitis of horses and man, and the like.

These possibilities, and none of them is more than that so far, are hinted in reports to the scientific journal, *Science*, (July 19).

The thyroid suggestion comes from studies on mice by Dr. D. Frank Holtman of the University of Tennessee.

The injection of local anesthetics, technically termed nerve block, is being studied in relation to polio by Dr. Norman Nelson of the University of California at Los Angeles.

Success in treating western equine encephalomyelitis in mice by ether anesthesia is reported by Drs. S. Edward Sulkin, Andres Goth and Christine Zafonotis of Southwestern Medical College, Dallas, Texas.

In trying nerve block for polio, Dr. Nelson follows the idea that change in the circulation of the spinal cord is one of the things that determines whether

a polio patient will have muscle spasm and will be left with a paralyzed arm or leg.

"Overwhelming evidence," he says, "exists that disturbed circulation of the spinal cord is one factor in the production of paralysis in poliomyelitis."

He cites the case of a child who harbored the polio virus in his body for 19 days, seven to 14 being the usual period before the disease develops. The child remained well until immediately after a canoe race in which his arms were used as paddles. Then he developed paralysis in his arms only.

Disturbed circulation in the arms may have disturbed the circulation in that part of the spinal cord nerves supplying the arms and allowed the polio virus to attack the nerves. Blocking the nerves to an arm will increase circulation to the arm, Dr. Nelson points out. It might also increase circulation to the part of the spinal cord nerves supplying the arm. And that might determine whether or not the arm would be paralyzed by the polio virus.

Results of the studies so far are too few to warrant any conclusion that the nerve block is a treatment for polio, Dr. Nelson warns. He hopes that other scientists will study the same problem.

It took polio virus twice as long to kill mice treated with thyroid substances as to kill untreated mice, Dr. Holtman found. The thyroid-slowng drug, thiouracil, brought on paralysis faster with earlier deaths in polio-infected mice not given this drug.

Young mice, which tend to be more

susceptible to the virus, were protected longer by thyroid extract than older ones, which leads Dr. Holtman to the idea that the method, if it proves practical, may be useful only at certain ages in humans.

Trial of the thyroid-stimulating and slowing substances followed his earlier discovery that mice could tolerate polio virus much better when the animals were acclimated to low temperatures. Thyroid gland secretion is known to be greater on exposure to cold.

The reason for the Dallas group trying ether as a remedy for equine encephalomyelitis in mice is that general anesthetics come up to the following specifications for an ideal remedy for such diseases: 1. ability to cause reversible changes in body cells sufficient to destroy the virus without damaging the body cells; 2. partiality for cells of the central nervous system, a partiality shown also by viruses that cause polio, encephalitis and similar diseases.

Almost half, 42%, of mice given the ether treatment survived 10 days after killing doses of equine encephalomyelitis virus, but only 7.6% of the untreated mice survived the same dose for the 10-day observation period.

Science News Letter, August 3, 1946

Venezuela's petroleum production in 1945 was over 26 per cent greater than during 1944; Venezuela occupies second place among the world's oil producing countries.



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Mushroom or Toadstool?

► "REALLY, I'd like to take them along and cook them, but I don't know whether they're mushrooms or toadstools."

How often have you heard people say something like that?

There seems to be a widespread notion that if a fleshy fungus is good to eat it is a mushroom, and that if it is poisonous it is a toadstool. Actually, however, the two names are completely synonymous: every mushroom is a toadstool, and every toadstool a mushroom. That is because mushroom and toadstool are shape-names, not class-names distinguishing between edibility and unwholesomeness. Any fleshy fungus with a stalk and a more or less circular cap is a mushroom. It is also a toadstool.

Not all the fleshy fungi are included in this mushroom-toadstool group. Puffballs, coral fungi and tooth fungi, for example, are neither mushrooms nor toadstools: they are not the right shape,

though they are botanically related to the mushrooms. On the other hand, the edible morel, one of the tastiest of wild fungi, is much less closely related to most mushrooms than are puffballs, yet it is commonly called a mushroom because it has a stalk and at least a kind of cap.

There is no ready way to distinguish between edible and inedible mushrooms. Rule-of-thumb tests, like peeling the cap, dark color underneath, and turning a silver spoon black, are all unscientific and completely unreliable. There are good and bad mushrooms that peel, good and bad ones that don't peel. As for gill color—well, the one mushroom commonly sold on the market is dark brown to black underneath when it is ripe, and the deadliest of all poisonous kinds, the Amanitas, are always innocently white! No, the only way to be sure of your wild mushrooms is to turn botanist to the extent of learning each species and knowing definitely which are edible and which are not.

One group of ready recognition characters will enable you to know—and so avoid—the deadly Amanitas when you meet them. The base of the stalk is enclosed in a ragged-edged cup, or at least has the fragments of a cup clinging to it, and half-way or more up the stalk is a ring, which sometimes hangs down like a veil. Some edible mushrooms have cup but no ring, others ring but no cup; but only Amanita has both. Further to complicate matters one of the best of all mushrooms is a non-poisonous Amanita—but it is safest for the amateur to pass this one up and avoid all Amanitas.

Science News Letter, August 3, 1946

CONSTRUCTION

No Rafters and Trusses In New Building Method

► HERE IS something new:

House-construction using self-strengthening arches on posts, eliminating all need for rafters or trusses in the roof and for load-bearing walls.

Suitable for use in both temporary and permanent buildings, the technic has been tried and tested. It was employed in constructing a war housing project of 160 houses and a community center at Sidney, N. Y.

The new system is called "ratio structures." It is based on arches supported on a series of free standing posts. The posts and arches are erected first, then the building is erected from the roof down, rather than from the ground up.

The new system can be used with metal, plywood, or composition board. Windows and other openings may be placed where wanted because the outer wall panels bear no weight, being actually supported by the roof-post system.

Instead of the arches, standard box-girder flat roof can be used. The space within the box-girder can be used for air circulation, for insulation, and even for the installation of plumbing pipes, electric wiring, and heating and ventilating ducts.

A description of the new type of construction is available from the Office of Technical Services, U. S. Department of Commerce. It is written by the man who developed the structural system, Paul Lester Wiener of the former War Production Board.

Science News Letter, August 3, 1946

MEDICINE

Body Defense Mechanism Fights Pneumonia Germs

► DISCOVERY of a hitherto unknown defense of the body against pneumonia germs is announced by Drs. W. Barry Wood, Jr., Mary Ruth Smith and Barbara Watson of Washington University School of Medicine and the Oscar Johnson Institute for Medical Research at St. Louis.

Some quality of the surface of lung tissue and of other tissue, these scientists find, allows white blood cells and other scavenger cells of the body to destroy pneumonia germs without the aid of special antibodies.

This is contrary to previous ideas on the subject. Current medical books tell you that virulent pneumonia germs are protected from scavenger cell destruction by the sugary capsule surrounding each pneumonia germ. Only when a special antibody called opsonin is present to help can the scavenger cells gobble up pneumonia germs, capsule and all.


This failed to reveal why untreated patients sometimes recover from pneumonia before a specific antibody is found in their blood or why sulfa drugs usually bring about a crisis leading to recovery several days before immune substances appear in the pneumonia patient's blood.

The new discovery gives an adequate answer to these unsolved questions.

In their report to the scientific journal, *Science*, (July 12), the St. Louis scientists hint that the newly discovered defense mechanism may operate against other capsulated germs.

Science News Letter, August 3, 1946

*** ASTRONOMICAL PHOTOGRAPHS**



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• Books of the Week •

THE BACONIAN LECTURES ON AIMS AND PROGRESS OF RESEARCH IN THE STATE UNIVERSITY OF IOWA 1945—*Univ. of Iowa*, 121 p., paper, \$1. Reports of research in biological sciences, chemistry, history, language, economic science, applied arts, engineering, psychiatry, child welfare, medicine.

BLUE-WATER MEN AND OTHER CAPE CODDERS—Katharine Crosby—*Macmillan*, 288 p., illus., \$3.50. A book written by a Cape Codder about the Cape, its houses, churches, people, and stories.

CAMPS AND COTTAGES How to Build Them—Charles D. White—*Crowell*, 260 p., illus., \$3., rev. ed. Plans enabling a person with no experience to build a cottage, camp, guest house, or outdoor furniture and equipment for cooking.

CLASSIFICATION OF BARLEY VARIETIES GROWN IN THE UNITED STATES AND CANADA IN 1945—Ewert Aberg and G. A. Wiebe—*Government Printing Office*, 190 p., tables and illus., paper, 35 cents. U. S. Department of Agric., Technical Bull. No. 907.

DIABETIC CARE IN PICTURES: Simplified Statements with Illustrations Prepared for the Use of the Patient—Helen Rosenthal, Frances Stern, and Joseph Rosenthal, M.D.—*Lippincott*, 150 p., illus., \$2. A book to serve as part of the diabetic's equipment so that he may understand diabetes and its treatment and give fullest cooperation to the physician.

ECHINODERMS FROM THE PEARL ISLANDS, BAY OF PANAMA, WITH A REVISION OF THE PACIFIC SPECIES OF THE GENUS ENCOPE—Austin H. Clark—*Smithsonian Institution*, 15 p., illus., paper, 15 cents. *Smithsonian Miscellaneous Collections*, Vol. 106, No. 5.

EMERGENCY SURGEON—Paul H. Osiek, M.D., and Robert S. Richardson—*Dorrance*, 291 p., \$2.50. A behind-the-scenes account of the cases that come to the Emergency Hospital, written in the form of an autobiography but having the broader aim of discussing problems which medicine and society must meet.

FORENSIC CHEMISTRY AND SCIENTIFIC CRIMINAL INVESTIGATION—A. Lucas—*Longmans*, 340 p., tables, \$7., 4th ed. A treatise, revised and brought up-to-date, on the use of chemistry in the solution of certain problems that arise in connection with the administration of justice.

FOREST SOILS AND FOREST GROWTH—S. A. Wilde—*Chronica Botanica*, 241 p., tables and illus., \$5. The origin and genetical properties of forest soils, their physics, chemistry, and biology, relation to forest vegetation, and importance in silvicultural management. The subject matter of a course given for upper class and graduate students in forestry, soils, and botany.

HOW TO PICK A MATE: The Guide to a Happy Marriage—Dr. Clifford R. Adams and Vance O. Packard—*Dutton*, 215 p., \$2.75. The questions everyone has about marriage fully answered by up-to-date scientific knowledge and the inclusion of psychological tests.

INDUSTRIAL ELECTRICAL CONTROL—E. S.

Lincoln—*Duell*, 374 p., tables and illus., \$3. A manual for the study of the control equipment by means of which the basic voltage of all electrical apparatus is regulated. Describes the fundamentals of control by resistance, reactance, electronic means, and swirching.

INDUSTRIAL ELECTRIC HEATING AND ELECTRICAL FURNACES—E. S. Lincoln—*Duell*, 192 p., tables and illus., \$3. An analysis of the fundamentals of resistance heating; of induction heating apparatus which employs low and high radio frequencies; and of the various uses of electric steam boilers, industrial heating cables, and electric furnaces.

INVESTIGATIONS IN EROSION CONTROL AND RECLAMATION OF ERODED SANDY CLAY LANDS OF TEXAS, ARKANSAS, AND LOUISIANA AT THE CONSERVATION EXPERIMENT STATION, TYLER, TEX., 1931-40—*Government Printing Office*, 76 p., tables and illus., paper, 20 cents. U. S. Department of Agric., Technical Bull. 916.

MAMMALS OF SAN JOSE ISLAND, BAY OF PANAMA—Remington Kellogg—*Smithsonian Institution*, 4 p., paper, 5 cents. *Smithsonian Miscellaneous Collections*, Vol. 106, No. 7.

MATHEMATICS A Historical Development—Lee Emerson Boyer—*Holt*, 478 p., illus., \$3.25. The most important and practical topics of arithmetic, algebra, geometry and trigonometry couched in a historical setting, a book aimed at providing the general student some means of learning about the nature and use of mathematics from early times to the present.

MOTHER AND BABY CARE IN PICTURES—Louise Zabriskie—*Lippincott*, 203 p., illus., \$2., 3rd ed. A book primarily for expectant mothers and fathers, but also useful as a maternity guide for practical nurses. In this 3rd ed. emphasis has been placed on nutrition, mechanism of labor, and the care of the baby.

THE NORTH AMERICAN CLEAR-WING MOTHS OF THE FAMILY AGERIIDAE—George P. Engelhardt—*Smithsonian Institution*, 222 p., illus., paper, 75 cents. United States National Museum, Bull. 190.

A PRIMER FOR STAR-GAZERS—Henry M. Neely—*Harper*, 334 p., illus., \$3.75. A practical book enabling the novice to find any visible star or constellation. Includes "sky-pictures" and star calendar.

PRIMEROS AUXILIOS: Quirúrgicos y Médicos—Warren H. Cole, M.D. and Charles P. Puestow, M.D., Trans. into Spanish by Dr. Ramón Rodríguez de Mata—*Appleton-Century*, 474 p., illus., \$3.75, 2nd ed. Translation of *FIRST AID: Surgical and Medical*.

PROCEEDINGS VOLUME OF THE GEOLOGICAL SOCIETY OF AMERICA FOR 1945—*Geological Society of America*, 339 p., illus., paper, \$1.50.

SOUL OF LODESTONE: The Background of Magnetical Science—Alfred Still—*Murray Hill Books*, 233 p., \$2.50. A history of man's thoughts about magnetism and of the uses to which he has put it.

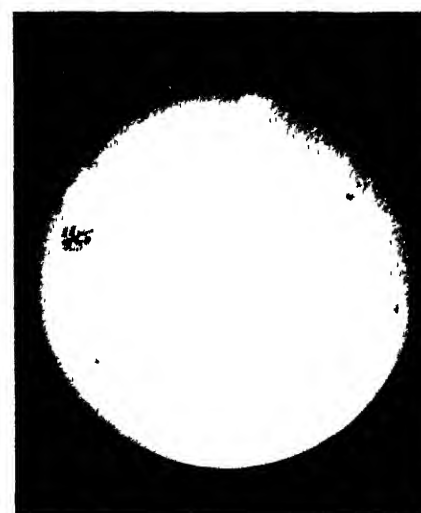
SWITCHBOARDS AND PANELBOARDS—E. S. Lincoln—*Duell*, 150 p., tables and illus.,

\$3. A description of the construction, operation, and maintenance of switchboards and panelboards, and of the various modern industrial uses to which these are put.

TAHITI LANDFALL—William S. Stone—*Morrow*, 308 p., illus., \$3.50. A view of an island paradise and of a life of incredible ease.

THE VEGETATION OF SAN JOSE ISLAND, REPUBLIC OF PANAMA—C. O. Erlanson—*Smithsonian Institution*, 14 p., illus., paper, 15 cents. *Smithsonian Miscellaneous Collections*, Vol. 106, No. 2.

Science News Letter, August 3, 1946



SUNSPOT—Enormous spot on the sun caused the brilliant auroral display in northern latitudes and short-wave radio broadcasts to be blacked out over the week-end of July 26. The sunspot is shown as it appeared on July 22 in this photograph by Mrs. L. T. Day of the U. S. Naval Observatory. It was large enough to be seen through smoked glass.

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•New Machines And Gadgets•

☼ **ROOFTOP** insulation which can be applied with an ordinary paint brush or spray gun reflects 80% of the sun's rays and reduces interior temperatures by as much as 15 degrees. The paint dries in one hour to form an aluminum, foil-like protective shield.

Science News Letter, August 3, 1946

☼ **AUTOMOBILE** battery fits ordinary battery cradles but needs little attention as its water-capacity is three times that of ordinary batteries. It is in a hard, durable rubber container and has fiber-glass insulation which prevents loss of power-producing active material from the plates.

Science News Letter, August 3, 1946

☼ **BED ATTACHMENT**, extending crosswise under the bed covers to relieve patients of the weight of the bed clothes over injured parts, is an arch-shaped frame with adjustable end clamps to fasten it to the bed rails. The supporting arch can be moved forward and back, and also can be raised or lowered.

Science News Letter, August 3, 1946

☼ **RUBBER** anchors for scatter rugs help reduce accidents by keeping rugs from slipping on highly polished floors. The protective underlay, a sponge rubber cushion, can be cut to fit any size rug or runner. It can be cleaned with a damp cloth.

Science News Letter, August 3, 1946

☼ **TRI-VISION** camera and companion viewer are modern counterparts of the



Victorian stereoscope and stereoscope camera. Pictures taken in the twin-lensed camera are put into a slot in the viewer, where, illuminated by the enclosed batteries, they are seen in three-dimensions.

Science News Letter, August 3, 1946

☼ **COMBINED** ironing board and stepladder has the customary crossed legs, but they pivot in their centers. Crossarms on each pair of these legs form the steps for the ladder, and the ironing board itself becomes the support to hold the ladder upright.

Science News Letter, August 3, 1946

☼ **EASY-TO-FIND** vanity case fits into

a holder which is neatly pinned on to the dress or lapel. Sides of the holder are flush with the front of the vanity case, and contain finger notches for easy removal.

Science News Letter, August 3, 1946

☼ **DELIVERY RACK** of cardboard, for carrying neckties from the cleaners has several T-shaped slots for receiving ties without crushing, and for holding them firmly in place during delivery. Rack can be made cheaply enough to be left free with each customer.

Science News Letter, August 3, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 8, D. C., and ask for Gadget Bulletin 322. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

Membership in THINGS of Science are now being accepted to fill vacancies in list. To receive next 12 blue boxes containing interesting actual specimens of new and unusual materials, send \$4 to Science Service, 1719 N St., N. W., Washington, D. C. Current unit is on blast furnace slag.

Change-of-Address Coupon

In requesting change of address please give New address on lines below and mail this entire coupon (including imprint of old address at right) to Science News Letter, 1719 N. W., Washington 8, D. C. Do this at least two weeks before change of address is to become effective. Date on lower line of imprint at right is date your subscription expires. Please renew early to avoid missing any copies.

PLEASE PRINT
New Address.....

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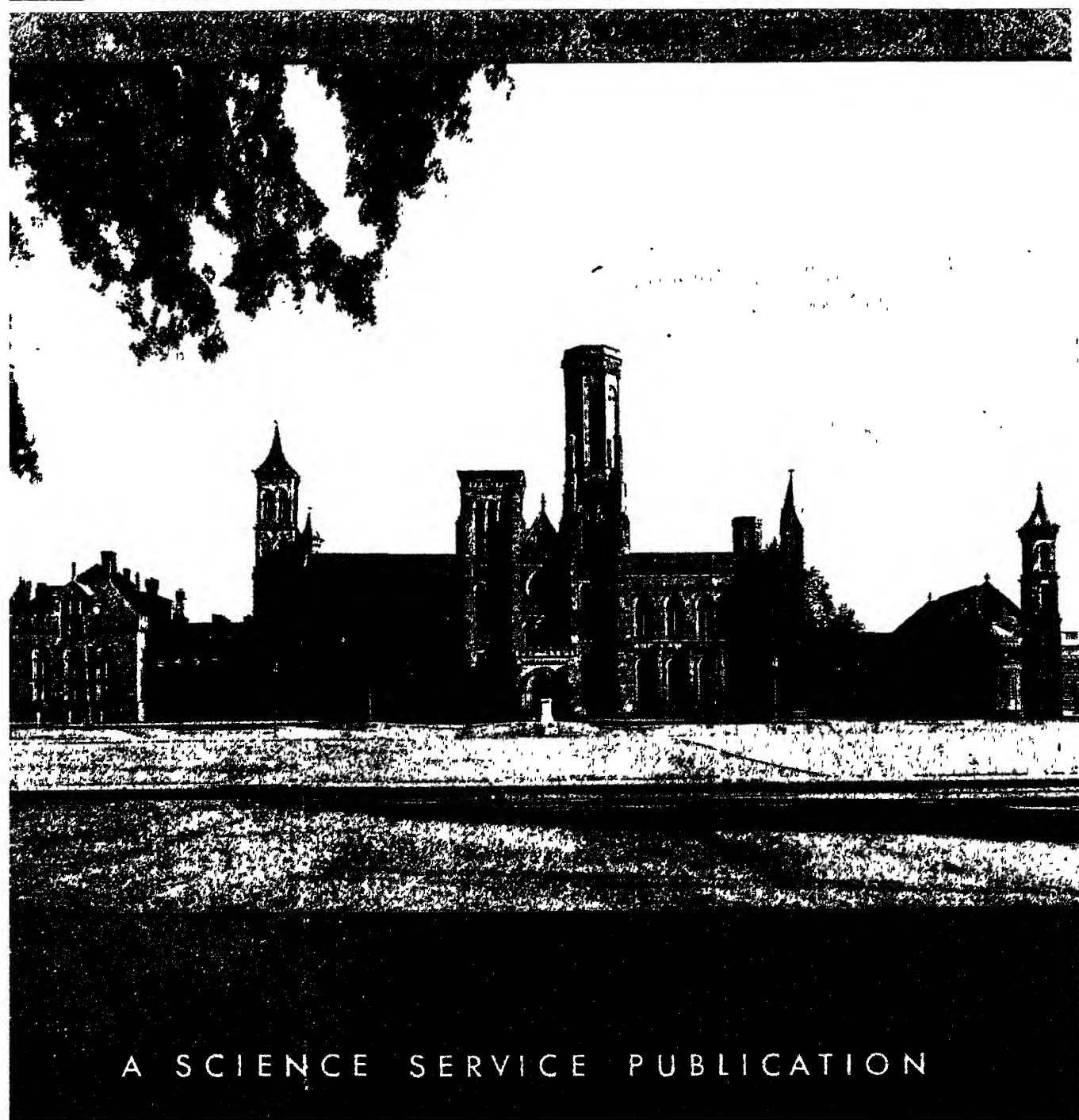
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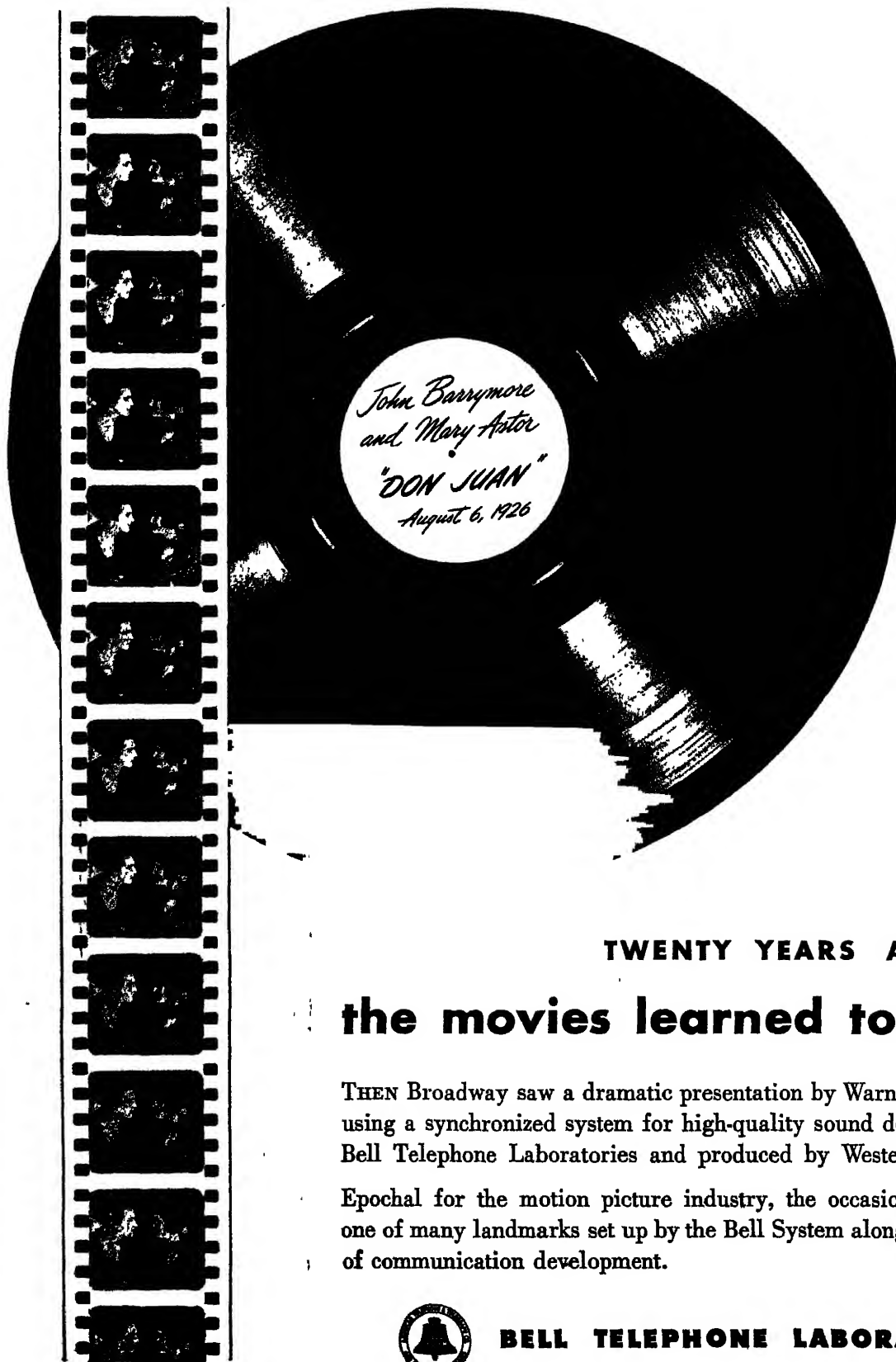
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SCIENCE NEWS LETTER



A SCIENCE SERVICE PUBLICATION



TWENTY YEARS AGO

the movies learned to talk

THEN Broadway saw a dramatic presentation by Warner Brothers, using a synchronized system for high-quality sound developed by Bell Telephone Laboratories and produced by Western Electric.

Epochal for the motion picture industry, the occasion was only one of many landmarks set up by the Bell System along the stream of communication development.



BELL TELEPHONE LABORATORIES

EXPLORING AND INVENTING, DEVISING AND PERFECTING, FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

PHYSICS

Carbon 14 Into Service

Radioactive isotope carbon 14, byproduct of the atomic bomb, has been shipped to hospitals and research laboratories to begin its career for science.

► FIVE LITTLE pea-sized amounts of an atomic bomb byproduct, called radioactive carbon isotope 14, were shipped from Oak Ridge, Tenn., on Aug. 2, first of the Manhattan District's atomic materials to be put to peaceful use.

For the next 10,000 to 25,000 years these chemicals from the atomic pile will emit 37,000,000 electrons a second, allowing them to be traced wherever they are. More important is this fact:

In a few years or even months the five laboratories receiving these new research materials may be able to announce new discoveries about cancer, diabetes, the conversion of sunlight into stored energy, tooth decay and fat utilization in the human body.

First carbon 14 unit, with the active material weighing only about one ten-thousandth of an ounce, went to the Barnard Free Skin and Cancer Hospital of St. Louis, with Dr. E. V. Cowdry and Dr. William L. Simpson receiving the precious stuff that today is more useful than radium.

Some of the problems in diabetes will be unraveled by use of another carbon 14 unit by Dr. D. Wright Wilson of the University of Pennsylvania School of Medicine. Carbon in sugar and lactic acid will be tagged with the radioactive carbon and fed to well animals and those sick with diabetes.

At the University of Minnesota Dr. W. D. Armstrong will trace the deposition of radioactive carbon in inner pulp and enamel of teeth and in bone, fundamental information needed in puzzling out the reasons for good and bad teeth. Similarly Dr. I. L. Chaikoff at the University of California School of Medicine will follow its use in liver, muscle and blood.

First use of carbon 14 upon a non-medical problem will be by Nobelist James Franck of the University of Chicago in photosynthesis studies. This is the basic method of storing the energy of the sun in plants. Understanding this mechanism of the green leaf may mean more to an energy-using world than energy from the chain-reacting uranium pile.

In the St. Louis cancer studies made possible with carbon 14 the radioactive material in the form of a carbonate will be converted into carbon dioxide and then into acetic acid. It will be shipped to Antioch Collège where a cancer-producing agent, called 20-methylcholanthrene, will be prepared. This chemical, full of tagged carbon atoms, will be used in animal experiments at both Antioch College and St. Louis to discover just where the cancer-producing parts of the compound do their cancerous work.

While the first use of radioactive carbon 14 is as a label, tracer or tag, detecting the atomic explosions of its atoms with Geiger counters, it may be possible later to use it as an agent in the actual treatment of some diseases.

Hundreds of requests for radioactive

elements made in the Monsanto-operated Clinton laboratories, uranium piles have been received. Many other kinds of chemical elements, made artificially radioactive, will shortly be supplied.

Radioactive gold is wanted by Vanderbilt University to study possible use in treating leukemia. Radiophosphorus 32 is desired by Purdue for medical research. Sulfur 35 would be used by American Smelting and Refining Company at Salt Lake City to study plant growth. Montefiore and Memorial Hospitals in New York ask for radioiodine for thyroid studies. The University of Michigan wants radioactive antimony, arsenic and caesium for fundamental nuclear studies.

Radioisotopes are sold by the government at cost, the radiocarbon units costing \$400 each.

Science News Letter, August 10, 1946

An important *by-product* of corn is the oil found in the germ, of which 200,000,000 pounds are produced annually in America.

The brown-winged *hawk* always garnishes her eggs with one carefully placed green leaf.



OCEAN BOTTOM—Part of a sunken wreck with fish swimming through it at a depth of 138 feet. The picture was taken with a camera recently developed for photographing the depths of the ocean. Two such cameras have been developed by Dr. Maurice Ewing of Columbia University and Woods Hole Oceanographic Institution and his associates, Allyn Vine and J. L. Worzel. Both pieces of apparatus include an upright pole with the trigger at the lower end. They point nearly downward, and exposure is made when the extended trigger hits the bottom at the proper depth.

ATOMIC ENERGY

Bikini Breath of Death

Lethal fog of radioactive water droplets and fission byproducts lingered at Bikini long after subsurface explosion, and left complete death in its wake.

By DANIEL WILKES

Science Service Crossroads Correspondent

► THE BREATH of Death, even more than the shattering of ships, was the most awesome thing about the second atom bomb's subsurface burst at Bikini.

It is already being suggested that newer capital ships might have survived the underwater shock that sank the old Saratoga and the older Arkansas and Nagato, but if they did remain afloat they would surely be manned only by corpses.

That clinging, persistent, lethal fog of radioactive water droplets and fission byproducts that the bomb spewed into the air over the whole target area on Baker Day, drenching every ship in the array, could hardly have left anyone alive on board when it finally did move slowly away, like a legendary monster reluctantly leaving its prey.

Anybody on deck of a ship drenched with this deadly fog would be a "goner," Vice-Adm. W. H. P. Blandy, commander of Joint Task Force One, commented. And the ventilating systems of all present-type ships would most probably spread it all through their interior spaces before the blowers could be shut down.

The Breath of Death seems to have taken Navy biological experimenters somewhat off their guard. Capt. R. H. Draeger, in charge of the goat, pig and white-rat details, stated before the test that only 20 pigs would be placed on two ships, and 200 mice on four ships, as compared with more than 3,000 animals that were exposed to the aerial blast on July 1. Had anything like the long-hovering, killing mist been anticipated, it may be taken for granted that a larger number of experimental animals would have been used for the second test.

Even after the cloud itself had slowly moved off, a large part of Bikini lagoon remained too "hot" with radioactivity to permit anything but the quickest dashes into the contaminated area, under carefully guarded conditions.

Whereas few fish if any were killed by the first blast, this time there were

plenty of them. Probably they succumbed to the same shock wave that sank the ships, though lethal radiological effects may help to account for them.

Navy Research Began Early

► THE STORY of the devastation in the lagoon at Bikini began more than two years ago in early 1944, before the first atomic bomb was exploded.

These tests are based, in part, on tactics considered for use against Japanese naval power, Rear Adm. W. S. Parsons, deputy task force commander for technical direction, revealed as the damage from the underwater blast July 24 was surveyed.

"Late in 1943 and early in 1944 we did not own bases from which we could attack Japan," Adm. Parsons explained, adding that Truk was a primary target.

"For a few months in 1944 until Truk ceased to be a threat, some consideration was given the atomic bomb, which was still in the development stage, for use against the Japanese navy.

"After we went duck shooting through the Truk area in 1944, the Japanese Navy ceased to be a threat, and we stopped considering the bomb for use against it," Adm. Parsons disclosed.

Maj. Gen. Leslie R. Groves of the Manhattan District and others were in on the calculations at that time, he reported.

"Our memory of the earlier considerations served as a background when we began laying out these tests," the deputy task force commander said, adding:

"I must say that our ideas in 1943 and 1944 on naval atomic warfare were not fully developed.

"These tests at Bikini represent a much greater crystallization of thought on the matter," Adm. Parsons declared.

He pointed out that the job of developing the atomic bomb went into high gear late in 1942. At that time, and for some time after, the United States was fighting a defensive war. Therefore, he said, it was necessary to give thought to using it in a manner which would at

that time most benefit American tactics—against Japanese naval power.

Once that threat was eliminated, the primary target became Japanese cities, and all effort was given to developing tactics for such targets as Hiroshima and Nagasaki.

Scientists are getting their first really good chance to get full information about what atom bombs can do as a result of the two tests at Bikini, Adm. Parsons pointed out.

This is because there was plenty of time to plan out the whole operation and set up instruments and recording cameras exactly as wanted. There will also be time enough to evaluate, compute and compare.

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The test at Alamogordo, in March, 1945, could not be called a test in the full scientific sense, because it had to be conducted under wartime pressure, which permitted no time for obtaining

full instrumental and photographic data.

Adm. Parsons was in charge of Naval activities at the atomic bomb factory at Los Alamos, N. Mex., where the weapon was developed.

Science News Letter, August 10, 1946

PHYSICS

Atomic Age Up to Now

The first anniversary of the bombing of Hiroshima records a brief but portentous history. Great strides include shipping of isotopes for peacetime research.

► THE WORLD'S new era, the Atomic Age, has had a very brief history so far, but one packed with tense drama. First intimation that most people had that the dreamed-of possibility of using atomic energy had been realized came just a year ago. The Japanese city of Hiroshima was blotted out by a single air-borne bomb, hastening the end of the second World War.

The first anniversary of this epoch-marking catastrophe was heralded only a few days ago by two less spectacular events which may, however, prove even more significant in the longer perspective of history. First was the signing of the atomic energy control bill by President Truman on Aug. 1, putting the power over fissionable materials and their uses definitely into the hands of a civilian commission. Second was the shipment from Oak Ridge, Tenn., of nuclear fission products intended for peacetime scientific purposes. These steps should mark the turning of atomic power from the ways of war to the paths of peace.

Although Aug. 6 will probably be observed hereafter as the anniversary day of beginning of the Atomic Age, actually that age had a dawn running back into the last few years of the nineteenth century, when X-rays and related phenomena were discovered in European laboratories, followed shortly by the demonstration of radioactivity and the discovery of the element radium by the Curies.

A much condensed chronology of the later dates in atomic energy history includes at least the following:

1939, Jan. 26: American physicists first heard of European experiments showing that slow-neutron bombardment would split nuclei of a uranium isotope, with release of energy.

1942, Dec. 2: First self-maintaining nuclear chain reaction was initiated in a uranium-graphite pile at the University of Chicago.

1945, July 16: First atomic explosion engineered by man blasted the New Mexico desert. Cost of project, to this date, \$2,000,000,000.

1945, Aug. 6: First military use of atomic bomb resulted in destruction of Hiroshima, Japan.

1945, Aug. 11: Second atomic bomb exploded over Nagasaki, Japan.

1946, June 30: First atomic bomb exploded in air over naval vessels at Bikini atoll, sinking five and severely damaging many more.

1946, July 24: Second (subsurface) atom-bomb explosion at Bikini sank three capital ships and several submarines, and damaged other vessels.

1946, Aug. 1: Civilian control of atomic energy becomes law of the land in U. S.

1946, Aug. 2: First shipment of fission products for scientific research made from Oak Ridge, Tenn.

Science News Letter, August 10, 1946

METALLURGY

Slag, Useful By - Product

► OUT OF the blast furnace comes not only iron for America's large ships and high buildings, but slag, constructing material for highways, bridges, and airports. About one ton of slag is produced

along with every two tons of iron.

Slag is made in the Ohio valley, along the shores of the Great Lakes, by the Chesapeake and in the folds of the mighty Appalachians. It is used in almost

every state east of the Mississippi, from Canada to the Gulf.

During the past four decades over 100,000,000 tons of slag have been used in various types of construction. Approximately 60% of this was used in building and maintaining highways in 23 states. Another 25% was used as ballast by railroads.

Molten slag floats on top of molten iron because it is lighter. Either of the two may be drawn off separately. When withdrawn from the furnace, the dissolved gases tend to escape from the molten slag. Some of the bubbles are trapped, however, and generate the pore structure in the solidified slag.

These cells or bubbles within the slag are near-vacuum. They expand the volume of the slag materially, decreasing its weight, yet its structural strength is reduced but slightly. Some slag today is specially treated so it will have a large number of air pockets.

Most of the mineral wool used for insulating is made from slag. Melted in a small furnace or cupola, the slag is run down small grooves where jets of air or steam under high pressure shred it into small blobs. The very speed of these tiny bullets forces the material in them to develop into tails of very fine threads which in turn use up the mass of slag. Mineral slag has only a tiny "shot" head attached to a long fiber tail.

One of the newest uses for slag is in neutralizing soil that is too acid. Sometimes used in place of lime, agricultural slag is made by crushing pieces of slag to extreme fineness.

If you would like to have samples of light-weight slag, mineral wool, slag coated roofing and other specimens, you can secure the Slag Unit of THINGS of Science, a kit prepared by Science Service, by sending 50 cents to SCIENCE NEWS LETTER, 1719 N St. N.W., Washington 6, D. C., and asking for THINGS unit No. 69

Science News Letter, August 10, 1946

ANIMAL NUTRITION

Cattle Thrive on Phosphate Drink

► CATTLE on the King Ranch in southern Texas have been getting a phosphate drink and thriving on it. Phosphate salts are added to the drinking water to make up for insufficient supplies in the native vegetation in experiments conducted by the U. S. Department of Agriculture and Texas scientists. Besides being convenient for cattle owners, putting the phosphates in the drinking water enables each animal to get its supply in a soluble form readily assimilated.

Science News Letter, August 10, 1946

GARDENING

Garden Tools To Aid Blind

Strange tools help the blind to have gardens of their own. Wires guide rake and keep weeder safe distance from plants; rod keeps hoe from digging too deep.

➤ SPADES with bars to keep them from biting too deeply into the soil, hoes with clips so that wire can be used as a guide in keeping rows straight, and weeders with side extensions so they will not get too close to the crop—this strange assortment of garden tools enables blind men and women to have gardens of their own.

So that those who have lost their sight can prepare the soil, plant the seed in straight rows, get rid of weeds themselves and harvest the tomatoes, beans, lettuce, radishes and beets, special tools have been devised by Hugh Findlay of Hatch Lake, Eaton, N. Y. Formerly director of landscape architecture at Columbia University, Mr. Findlay has been devoting the last few years to teaching gardening to the blind.

Rows in these gardens, often ten or twenty feet long, are kept straight by attaching the tools to wire pulled very

taut between tee-rods forced into the ground at both ends of each row. One ankle is allowed to rub against the wire while raking or hoeing, to keep the tool from going off-center.

The depth to which the spade or hoe can sink into the soil may be changed by readjusting the gaging rod. If corn is to be planted in hills, the bar will be adjusted in the lower holes of the spade. The third set of holes, farthest from the tip of the spade, are used in planting potatoes. For late or midseason corn or beans, the bar will be fixed in the second set of holes in the hoe so the furrow may be drawn deeper.

While the plants are still young, a Norcross weeder can be used by adjusting the side extension, that runs along the wire, so the blades will not come too close to the plants. Weeds may also be kept under control by running a scuffle hoe along a guide wire placed between the rows. The blind gardener in this case straddles the wire as he works.

These special tools were first tried out by Armand Michaud of the Perkins Institute and Massachusetts School for the Blind, Watertown, Mass., who, though blind, already had done some gardening. A number of war-blind at the Naval Hospital in Philadelphia are being taught to use these special contraptions, already in use in 28 different states, Cuba, Canada and China. Within a few minutes a blind person can memorize these tools.

Identify Soil by Feel

The right kind of soil for a garden, Dr. Findlay believes, can be identified by feel. Sometimes a sightless person can tell soil by its weight or smell, but it is always best to test the soil by placing a little in the palm of one hand and touching it carefully with the fingertips of the other.

The top and bottom of a bulb can be identified easily by its shape, and, in planting, the distance between the bulbs can be determined by measuring with the feet.

In sowing small garden seed, a small quantity is placed in the hand and with the aid of the thumb, the seed is worked

between the second and third knuckle. By keeping the wire over the furrow, when the tips of the fingers slowly follow the wire, the seed can be dropped in the proper place.

A hobby such as gardening keeps blind people out of doors, overcoming their natural tendency to stay in the house. Fascinating in all its phases, from first planting, through blooming with its wonderful fragrance, and the final triumph of a harvested crop, Mr. Findlay feels gardening is peculiarly adapted to the specialized senses and needs of the blind.

Science News Letter, August 10, 1946

MEDICINE

Rabbit Fever Pneumonia Cured by Streptomycin

➤ THE DRAMATIC recovery, thanks to streptomycin, of a patient dying of rabbit fever pneumonia, is reported by Drs. Richard B. Cohen and Richard Lasser of the Jewish Hospital of Brooklyn, N. Y., in the *Journal of the American Medical Association* (Aug. 3).

Neither penicillin nor sulfadiazine helped the patient. He was thought at first to be suffering from an atypical pneumonia caused by some virus. But as he got worse and because his job as steyedore might have brought him in contact with infected rodents, tests for plague and tularemia, or rabbit fever, were made.

The test for rabbit fever was positive and then it was learned from his relatives that he had gone rabbit hunting about three days before he got sick, though he had not skinned or eaten the rabbit he killed.

Within 48 hours after streptomycin treatment was started his fever dropped from 104 degrees Fahrenheit to 100 degrees, he felt much better and was on the road to recovery.

Science News Letter, August 10, 1946

AERONAUTICS

Military Planes Now Fly Knots and Nautical Miles

➤ YOU WILL have to brush up on your knots and nautical miles if you want to keep up with the Army and Navy planes in the future.

The knot is now the standard aeronautical unit of speed for both services, and the nautical mile is the corresponding unit of distance. This is the result of



GARDEN FOR BLIND—Distance from plants to the blade of the Norcross weeder is being measured to be sure the plants will not be injured. Note clip attached to the wire and winged screws for adjusting the distance of the weeder from the plants.

an agreement recently made.

From now on you will say that a military plane has a speed of so many knots. You will never say that it has a speed of so many knots an hour, because "knot" includes the "per hour." One knot is a speed of a nautical mile in one hour. And a nautical mile, the mariner's mile, is about 800 feet greater than the ordinary mile.

The nautical mile is supposed to be one-sixtieth of a degree of the earth's equator. American and English seamen call it 6,080 feet. In other countries it is slightly different, varying up to 8,087 feet.

The nautical mile is about 1.15 times as long as the familiar legal mile of

5,280 feet. Figures giving the speed of a plane in knots are therefore smaller than those giving it in ordinary miles.

When, for instance, the Army states in the future that one of its bombers is capable of 300 knots, it means, in the language to which we are accustomed, about 345 miles per hour. And the commercial transport that averages 300 miles an hour, in Army-Navy language does about 260 knots.

Air-minded people these days are looking forward to a plane that will travel at supersonic speeds; that is, speeds faster than sound travels. At sea level this is around 760 miles an hour. Supersonic speeds in "nautical" language will be those above 660 knots.

Science News Letter, August 10, 1946

MEDICINE

Protecting Against Polio

► LATEST ADVICE to parents anxious to protect their children from infantile paralysis: Have all cavities in the children's teeth sealed off by the dentist, so that the polio virus cannot invade the child's body through the decay-exposed nerves in teeth.

This advice comes in "an urgent plea to parents, physicians and dentists" made by Dr. Hans H. Reese, professor of neurology at the University of Wisconsin, and Dr. John G. Frisch, practicing dentist of Madison, Wis.

These scientists urge that the cavities or decayed teeth be treated early in the summer, before the polio season starts, but even now with infantile paralysis on the increase in many states, it may not be too late to take advantage of this protective measure.

The plea of the Madison scientists is based on findings showing that: 1. the polio virus can invade the body through pulp, nerves and tiny tubes in the dentin of teeth exposed by decay or cavities; 2. exposed tooth pulps occur some two and one-half or more times as often in young polio patients as in persons the same age who have not had the disease; and 3. more polio occurs in communities where the water supply is low in fluorine than where it contains enough of this chemical to prevent tooth decay in those who drink it while their teeth are developing.

Details of the findings are reported in the scientific journal, *Dental Digest* (July).

The Madison scientists confirm the

findings of two other scientists who previously reported that polio occurred two and one-half or more times as often in young polio patients as non-polios of the same age in the same communities. These scientists, Drs. Myron S. Aisenberg and Thomas C. Grubb, of the University of Maryland School of Dentistry, also reported that monkeys developed infantile paralysis after the virus had been dropped into the exposed pulps of their teeth.

Exposed tooth pulp, resulting from decay, is only one invasion route for the polio virus, both groups of scientists point out.

Science News Letter, August 10, 1946

MEDICINE

Seasickness Drug Overdose Fatal

► THE FATAL poisoning of a prisoner by a new seasickness drug taken while aboard a ship returning from England, has led the Army to warn against over-dosage with it.

This man and other prisoners dosed themselves with the drug for the "intoxicating" effect.

The drug, known as "Motion Sickness Preventive, Army Development Type," will soon be available to the public for air, train, sea, and car sickness.

As few as six tablets can poison a man, it appears from the report of Col. F. H. Foucar, Capt. B. S. Gordon and Capt. S. Kaye, in the *Journal of the American Medical Association* (July 20).

The patient who died is believed from post mortem tests to have taken at least 30 tablets, but another prisoner was admitted to the hospital appearing to be "intoxicated" after taking six tablets.

The new motion sickness preventive contains sodium amytal, atropine sulfate and scopolamine hydrobromide. The sodium amytal is believed to have caused death in the case of fatal over-dosage, though the medical officers point out that the question of a possible synergism between it and the belladonna alkaloids cannot be ruled out.

Science News Letter, August 10, 1946

CHEMISTRY

Easily Made Metal-Protecting Coat Available

► AMERICAN manufacturers can now make use of a German method of making a temporary coating to protect metal parts during shipment. The formula is available from the U. S. Government.

It is largely a mixture of wool fat, chinawood oil, natural resin and white spirits. It is applied with an ordinary paint brush, dries rapidly, and can be removed by washing with gasoline.

German chemists claim that it is effective against rust, corrosion, and salt water, and that it will not melt in the direct rays of the hot sun. A report, made by the U. S. Naval Technical Mission in Europe, which gives directions for preparing the mixture, can be obtained from the Office of Technical Services, U. S. Department of Commerce.

Science News Letter, August 10, 1946

RADIO

Science Club 10,000 Is CBS Radio Feature

► THE 10,000th science club of the nation to affiliate with Science Clubs of America, the Science Service organization, will be described in the "Adventures in Science" radio program over many of the stations of the Columbia Broadcasting System next Saturday, Aug. 17. The program honors the large growth of this science youth organization.

James F. Sears, sponsor of the Bloom Radio Club of Bloom Township High School, Chicago Heights, Ill., will be guest of Watson Davis, director of Science Service, on the program.

The program will be heard at 1:45 p.m., EST, 2:45 p.m. EDT, 12:45 p.m. CST.

Science News Letter, August 10, 1946

FOOD TECHNOLOGY

Loss of Ascorbic Acid Causes Tallowy Milk

► DAIRY scientists and the milk industry have known how to prevent the tallowy flavor in fresh milk, but they never knew the cause of it.

Now, Profs. V. N. Krukovsky and E. S. Guthrie of the dairy department at Cornell University have come up with the answer. They have traced the flavor to the reaction involving the rate of loss of ascorbic acid (vitamin C) in the milk. The scientists are able both to prevent and to induce this flavor.

As a result, they have been able to keep the fresh, pasteurized milk for many more days than is normally possible in the refrigerator without loss of palatability. In the Cornell tests, the milk kept for two weeks.

In addition, the research promises to be useful in the milk powder industry, and it applies in other fields, such as citrus juice-preservation where turpentine-like flavor has been of some concern, and in controlling flavors of certain meat products.

In one oxidative method, oxygen is bubbled through the milk during pasteurization. This greatly reduces the susceptibility of milk to tallowy flavor development.

Market milk contains two forms of vitamin C. These are ascorbic acid and dehydroascorbic acid. The reaction that causes the breakdown of fats in the milk, and thus results in development of the tallowy flavor, can be inhibited by quick and complete oxidation of ascorbic acid to dehydroascorbic acid and by the subsequent heat treatment in pasteurization, Dr. Krukovsky said.

With flavor control, he does not doubt the sale of milk can be greatly increased.

Science News Letter, August 10, 1946

ORDNANCE

Hydro-Bomb Powered By Rocket Engine

► THE HYDRO-BOMB, a new aerial torpedo powered by a rocket engine, was nearly ready for action when the Japs surrendered, the Army Air Forces have revealed.

Using the thrust of burning, expanding gases to propel itself through water, the hydro-bomb was designed by Westinghouse engineers to meet the need of the AAF for a torpedo that could be dropped 500 feet or more from fast

planes, permitting the plane to keep at a safer range from anti-aircraft fire. The new missile is described as the cheapest and simplest aerial torpedo yet developed.

The underwater rocket supplies its own oxygen from the solid fuel that is packed into the pipe-like motor. The impact of striking the water after the bomb is dropped from an airplane throws a switch igniting the fuel. The burning solid fuel sends gases through a nozzle to push the missile through the water.

Slightly shorter and thicker than a submarine torpedo, the hydro-bomb can carry 600 pounds of high explosives. Capable of a thrust of 1,000 pounds, the rocket engine can speed the new torpedo toward a target at 40 knots. Total weight of the projectile is 2,300 pounds.

Shock-treated for protection against the impact of striking the water after dropping hundreds of feet, the hydro-bomb survived a test drop of 2,000 feet.

Science News Letter, August 10, 1946

PETROLEUM

New Triptane Rating For Motor Fuels

► A NEW SYSTEM of rating motor fuels may result from the high-quality gasolines developed for modern airplanes. A "triptane number," rating the fuels according to a leaded triptane-heptane scale, has been proposed at the National Bureau of Standards to replace the current octane classifications.

The trouble with the 20-year old octane scale, according to the Bureau's Cooperative Fuel Research Committee, is that modern aviation fuels have gone over the top of the octane ratings. First prepared in 1926 to cover higher knock rating fuels than any then used, the old scale is now out-of-date.

Present octane numbers for the gasoline you put in your car are derived from the percentage of isooctane blended with normal heptane, which, in a standard engine, gives knock equal to that of a test fuel.

The newly-proposed rating would be in terms of blends of triptane and normal heptane, to both of which has been added about one-tenth of 1% of tetraethyl lead. Triptane is a relatively new compound of exceptionally high knock rating, and the new scale would cover a range from below to above present fuels.

So, one of these days, your gas may be rated with a "triptane number" instead of the present octane.

Science News Letter, August 10, 1946

IN SCIENCE

MEDICINE

PABA May Prove Typhus Fever Remedy

► ONE OF the B vitamins, para-aminobenzoic acid, or PABA for short, may prove an effective remedy for the kind of typhus fever occurring in this country. It has already shown promise in treatment of the louse-borne and far more deadly typhus fever that occurs in epidemics abroad.

Trial of PABA in typhus fever in this country is reported by Dr. Paul K. Smith of George Washington University School of Medicine, formerly lieutenant colonel at the AAF School of Medicine, Randolph Field, Tex., in the *Journal of the American Medical Association* (Aug. 3).

Fever persisted 12 or more days in 22 of 29 typhus patients not treated with PABA, but only seven of the 29 treated with the vitamin chemical had fever that long. There were no toxic effects from the chemical, which suggests that it might safely be given in larger doses with presumably even quicker recovery. Dr. Smith recommends a thorough trial of the chemical with more patients and under more rigidly controlled conditions.

The study was made with the cooperation of members of the Bexar County Medical Society who referred patients for treatment as soon as they thought the patients were suffering from endemic typhus fever.

Science News Letter, August 10, 1946

VETERINARY MEDICINE

Recent War Healthiest In History for Animals

► WORLD WAR II was the healthiest war in history for Army animals. Not a single outbreak of epidemic disease occurred among the many thousands of horses, mules, dogs and pigeons engaged in military operations, thanks to the care of the Veterinary Corps.

Production of vaccines to protect troops against typhus fever and some other diseases became the wartime mission of the Veterinary Corps' laboratory at the Army Medical Center because of the experience and excellent record of this laboratory in producing vaccines for animal protection.

Science News Letter, August 10, 1946



METEOROLOGY

Radar Reflectors Chart Wind 100,000 Feet Up

➤ SPECIAL war-developed reflectors, carried aloft by balloons and traced from the ground by radar, now give meteorologists data on the speed and direction of winds as high as 100,000 feet above the earth's surface, the Army Signal Corps discloses.

Two types of reflectors were developed during the war for use with military radar sets at frequencies ranging from 200 to 3,000 megacycles. A dipole-target consists of three short, foil-wrapped sticks, joined in the center to form 60-degree angles in a horizontal plane, and is for use with 200-megacycle, horizontally polarized radar sets. The other reflector, for microwave radar, is a box-kite-like affair with paper-backed aluminum foil supported in a triangular form by balsa sticks.

Before the war, sighting tubes, called theodolites, were used to chart the course of wind-recording balloons, but this arrangement would not work at night or in low visibility during the day.

The reflectors for radar wind observations were developed at the Signal Corps Engineering Laboratories, Bradley Beach, N. J., after early experiments had been conducted by the Signal Corps and by the Radiation Laboratory, Cambridge, Mass.

Science News Letter, August 10, 1946

AERONAUTICS

Electric Current Keeps Airplane Windshield Clean

➤ A COATED airplane windshield that eliminates ice and fog with an electrical current has been announced by the Pittsburgh Plate Glass Company.

A permanent transparent coating, commercially named Nesa, conducts an electric current clearing the windshield of ice and fog and strengthens the glass against impact, it was reported. Bonding the coating to another piece of glass with a layer of vinyl plastic is done to remove distortion. Visual characteristics are claimed to be approximately the same as untreated glass.

The coating can be applied to plate

glass, laminated safety glass and multiple-glazed units, and it strengthens the windshield by maintaining a temperature of between 80 and 120 degrees Fahrenheit, found to offer the most effective protection for laminated plate glass.

Electrical contact to the coating is made by applying metallic bus bars to the edges of the glass area.

The new coating was developed after wartime research to produce glass for radar equipment and other electronic instruments that would not collect static electricity and distort registering mechanisms.

Science News Letter, August 10, 1946

PHOTOGRAPHY

Six-Shooter Principle For Flash Lamps

➤ THE SIX-SHOOTER principle has been applied to photoflash lamps as Samuel Colt applied it to fire-arms a century ago. U. S. patent 2,404,970, issued to H. H. Magdsick of East Cleveland, Ohio, covers a flashlamp with a revolving cluster of six bulbs that can be turned so that each can be brought successively to the focal point of a parabolic mirror and "fired"

All the bulbs are mounted on a common base, which revolves on a spindle turned by a knurled head, held by a bracket at the top of the dry-cell holder. When all the bulbs have been used, the entire group is discarded and a new one set on the spindle in its place.

Science News Letter, August 10, 1946

CHEMISTRY

Chemical Enables Water And Gasoline to Mix

➤ WATER in gas tanks resulting from moisture condensation can be picked up by a chemical added to the fuel, and dispersed throughout the gasoline in such a way that it aids combustion. The chemical is a development of the Dacar Chemical Products Company.

In working on metal cleaning agents with the same constituents that gel gasoline, it was found that certain soaps of the polyethanolamine series act as water pick-up agents, and are at the same time soluble in gasoline. With them homogeneous mixtures up to 5% water can be obtained.

The chemical can be used as a gasoline anti-freeze, or in dehydrating underground gasoline tanks.

Science News Letter, August 10, 1946

CHEMISTRY

German Insecticide Supplements DDT

➤ AN INSECTICIDE that takes over where DDT stops in killing the insects that ravage gardens and orchards is now being produced from a formula discovered by German chemists.

The insect killer being produced by Monsanto Chemical Co. is hexaethyl tetraphosphate and was uncovered by U. S. scientific field teams in Germany.

Aphids, or "plant lice," and mites can both survive DDT, but the new insecticide is particularly effective against them. These insects that feed on foliage in gardens and orchards have a "field day" when DDT is used, according to chemists, because the DDT kills the natural enemies of the two pests. But the imported formula promises to restore a better balance when used with DDT.

Another important gain from the new enemy of aphids and mites is that present supplies of nicotine sulfate, used to kill them, are insufficient for national use.

Experiments conducted so far indicate that the brown liquid hexaethyl tetraphosphate will be superior to nicotine sulfate in some respects, chemists report.

Science News Letter, August 10, 1946

NUTRITION

Overseas Diet Was Good for Soldiers

➤ GIs GRIPE about the monotonous overseas diet, but apparently it did its job of keeping them well-nourished, at least so far as protein is concerned, regardless of the location or length of foreign service.

Capt. Herbert R. Plass, of the U. S. Army Medical Corps, made tests on the nutritional state of 421 Army Air Forces returnees, whose periods of foreign service ranged from 4 to 50 months, and found that the Army diet does not result in frequent deficiency diseases.

Since certain dietary diseases can be detected by a slight shift of what physicians call plasma protein, accurate graphs were kept to compare the average plasma protein of the returned soldiers with that of 50 soldiers and workers who had not been out of this country.

Even though more than half of the A.A.F. subjects ignored a balanced diet while celebrating their 21-day leaves, their nutritional state was normal within four weeks.

Science News Letter, August 10, 1946

CHEMURGY

Peanuts Do a Big Job

Besides their many food uses, peanuts give glue for bookbinding, silky fibers and a cork substitute. All parts of the plant and nut can be used.

By MARTHA G. MORROW

➤ THOSE CRUNCHY peanuts have some industrial brothers out of the same shells:

Glue for bookbinding, flexible and light-colored.

Cork substitute, made from the ground hulls.

Silky fiber for clothing.

And peanuts are still peanuts, even roasted in the shell for circus eating!

There are new developments in peanut products for your table:

Salted peanuts that are fresh after many months of storage.

Peanut butter from which the oil does not separate.

Peanut oil that does not get cloudy when kept in the refrigerator.

Peanuts, large quantities of which are marketed each year as peanut butter, salted peanuts and peanut candy, were once grown exclusively for sale roasted in the shell and for feeding to hogs. Many millions of pounds today are used in the form of oleomargarine, vegetable shortenings and salad oil. Tomorrow it may appear in a variety of forms ranging from glycerol to pocketbooks.

Excellent tacky glues have been made from the protein left after oil is extracted from the peanuts with a solvent. These re-wettable "goober glues" hold things together almost as tenaciously as animal glues. Light in color, they are particularly good for gumming white paper.

Paper gummed with this protein paste is not likely to stick when stored in a hot humid atmosphere. Particularly suited for use on cardboard or other products that must be bent when glued, these glues were prepared at the Southern Regional Research Laboratory. They are good for gluing paper-covered boxes and for bookbindings.

Silky Yarn from Protein

Both wool-like and silky fibers have been made experimentally from peanut protein. A sticky alkaline solution of the protein is forced through a rayon-type spinneret into an acid bath where it thickens into a yarn. The yarn is treated with formaldehyde to harden the protein and is stretched to bring the molecules into line.

Most of the research on the wool-like fiber was conducted in England. This yarn is suitable for use with rayon, cot-

ton and wool. Fiber with many silk-like properties was produced in the United States.

A way of stabilizing peanut butter so that the oil does not separate and rise to the top, leaving the bottom extremely dry, has been developed at the Georgia Experiment Station with the cooperation of the National Peanut Council, active in coordinating research on peanuts. An effective way of overcoming oil separation has long been sought because the oil floating on top of peanut butter becomes rancid more rapidly than when in contact with the ground peanuts. With little change of existing machinery, all peanut butter can now be protected against having the oil rise to the top.

The peanut butter with which we are familiar is made of finely ground, freshly dry-roasted, blanched peanuts with salt added. Flavored with orange, chocolate, malt and sweet pickle, peanut butter is now being wrapped as a confection. Firm enough to be put in block form, it can be sliced like cheese or meatloaf for use as a sandwich filling.

Oil Has Many Uses

Peanut oil has long shown promise as an excellent product for use in manufacturing mayonnaise and salad dressings, except for the fact that it becomes cloudy at low temperature. As this tends to make mayonnaise separate into layers of oil and water on long storage in the refrigerator, peanut oil has not been used commercially in mayonnaise.

It has recently been found that peanut oil can be dissolved in an organic solvent or mixture of solvents, chilled, and the undesirable portion removed by filtering. Taking only an hour and a quarter to "winterize," a yield of 80% of oil that does not become cloudy can be secured for use in mayonnaise, salad dressings and at the table. Through use of this same process, a modified oil has been developed that is reported superior to olive oil as a textile lubricant.

Control of the moisture content of peanuts and peanut products has been found to be of paramount importance in increasing the length of time they can be kept fresh. Rooms in which peanuts are stored should have a relative humidity of about 60%. Study has also shown that the moisture content of pea-



BY THE PECK—Peanut picker in operation on a farm. The vines and nuts go into the back of the picker with the shelled nuts pouring out the side into a tub. Hay is baled for livestock feed.

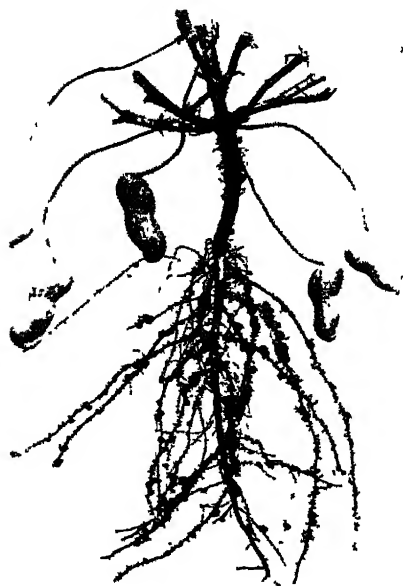
nuts should be kept about 1.5% for roasted peanuts, slightly higher for hard peanut candies, and around 5% for cured nuts.

Approximately 90% of America's peanut oil production goes into edible products, vegetable shortening and oleomargarine accounting for most of it. Non-food uses include the manufacture of soap, shaving cream, cosmetics and pharmaceutical preparations. Highly refined oil has been found to be a good carrier for important drugs such as penicillin and adrenalin. Other possibilities include the use of peanut oil in oil sprays and insecticide emulsions.

Peanut hulls, now burned as fuel at the processing plants, may some day be the source of wood alcohol. Grape and wood sugars contained in the hulls can be fermented by a novel process worked out at the Northern Regional Research Laboratory to produce alcohol and other organic liquids for use as motor fuel.

Peanut Is a Legume

Because of its peculiar growth, peanuts are usually sown and harvested by hand. Instead of being a nut, the peanut is really a legume like a pea or bean. Its fruit or pod, however, matures beneath



LEGUMES—Peanuts are not nuts at all. The stems or "pegs" on which the flowers appear elongate above ground, bend down and bore into the earth, and the pods develop underground. Photo by Bureau of Plant Industry, Soils, and Agricultural Engineering, U.S.D.A.

the surface of the soil.

The small yellow flowers are borne at the joints where the leaves are attached to the stems. As soon as pollination takes place, the flowers fade, the stem bends down, and the "peg" elongates and goes into the soil where the pod develops. Hence peanuts must be grown on soil with a loose surface.

Peanuts are usually planted in rows two or three feet apart, the individual plants being set at four-inch intervals to keep them from spreading too much and producing many poorly filled pods. After digging, the peanuts are stacked around poles for curing. They usually remain on the curing stacks three to six weeks before the nuts are picked from the vines. Better methods of harvesting are being studied and a planter of new design was tested this spring.

About 750 pounds of peanuts are harvested per acre as an average for the United States. In Virginia and North Carolina, 1200 pounds per acre are produced, while in Texas and Oklahoma only about 450 pounds are obtained from each acre. This difference is partly due to the fact that peanuts are usually harvested mechanically in the Southwest; in Virginia and the Carolinas it is done by hand.

Peanuts are one of the leading crops in many of the Southern states. Twice as many are grown in Georgia as in the other peanut-producing states. When hay, which is sold like alfalfa, is included, the total farm value of peanuts last year was around \$285,000,000. The lower grades of peanuts are crushed for oil, the top grades are kept for use in candy, salted peanuts and peanut butter.

Peanuts are harvested early in August in South Texas; they can be left on the ground until November or December in North Carolina and Oklahoma. Around 1,500,000 tons of peanuts are expected to be harvested this year.

Rotating Crops

Raising peanuts soon exhausts the soil, so this crop is usually grown on the same plot only every third year or so. Investigations conducted at the Alabama Polytechnic Institute show that blue lupine is an excellent legume to use as a winter cover crop to restore the soil.

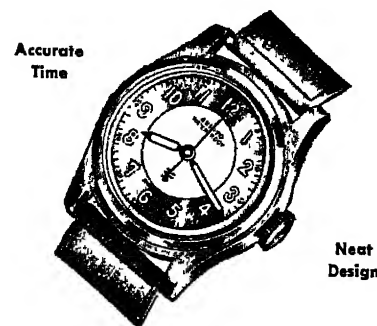
A top-notch soil builder is believed to consist of the following three-year rotation—one-third of the area planted in peanuts which are harvested. The barren peanut fields are protected during the winter by lupine with its rapid growth. The second year corn is grown. The third

year peanuts are produced, but instead of being harvested, hogs are turned in to fatten on the crop. The next year the soil is again ready to produce a bumper peanut crop.

Peanuts are exceptional among southern farm crops in that every part of the plant and all by-products resulting from the factory processing through which peanuts pass can be utilized in feeding stock. Peanut hay and light or inferior pods can be fed to the hogs on the farm. Meal from which the oil has been squeezed, red skins and "hearts," the embryo of the plant, all can be used to fatten hogs.

The hulls, besides being fed to stock, are utilized in insulation, paper board,

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Do You Know?

The cost of a *medical education* ranges from \$8,000 to \$12,000.

Malaria is a disease of the mosquito; man is an intermediate host.

Water-resistant *matches*, developed for soldiers, are now available for civilians; they will light after hours of soaking.

The *fungus* responsible for white pine blister rust cannot spread the infection from pine to pine, but lives one stage of its life on currant or gooseberry plants.

"Quick" *oatmeal* has a nutritional advantage over the old fashioned kind, it is claimed, since the content of vitamin B₁ or thiamin, decreases after the first 30 minutes of cooking.

A *shipping canal* to by-pass the Suez is said to be under consideration in London; it would be located in southern Palestine, connecting the Mediterranean near Gaza with a northern arm of the Red Sea close by Aqaba.

The strain of *mold* now used for most of the nation's penicillin production can be traced back to a mold on a Peoria, Ill., cantaloupe; with the help of X-rays or ultraviolet rays the yield of penicillin has been doubled.

YOUR HAIR AND ITS CARE

By O. L. Levin, M. D. and H. T. Behrman, M. D.

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plastic filler and explosives. Cork substitute containing ground peanut hulls will probably be produced commercially soon. Plastic molding powders may also be made from the hulls.

The edible portion of the peanut contains major proportions of three primary dietary necessities: protein, carbohydrates and fat. Because of its relatively low moisture content and high percentage of fat, it is one of the most concentrated of foods. One gram supplies 5.8

calories, as compared with 2.3 for beefsteak, 3.6 for whole wheat, 2.6 for white bread and 4 for pure cane sugar. In addition, it contains significant amounts of vitamins and minerals.

India ranks first in world production of peanuts, Africa second, China third and the United States fourth. Whereas the others use the peanut only as oil seed or to feed livestock, the United States alone has built up an edible food industry based on peanuts.

Science News Letter, August 10, 1946

GENERAL SCIENCE

Smithsonian Century Old

See Front Cover

► THE SMITHSONIAN Institution, America's most venerable research organization, is having a birthday—a very important birthday. It is exactly a century old today.

As part of the celebration, a special postage stamp has been engraved, the first sheet of which was delivered to the Institution's Secretary, Alexander Wetmore, by Postmaster-General Robert T. Hannegan at a special ceremony in the auditorium of the National Museum. The stamp, which is of three-cent denomination, shows the many-turreted old building on the Mall in Washington, D. C., that houses the executive offices of the Institution and part of its exhibits. A view of the building as it appears on the new stamp is shown on the front cover of this SCIENCE NEWS LETTER.

The Smithsonian Institution, which owes its origin to a bequest made by an Englishman, James Smithson, who never saw America, has charge over the U. S. National Museum, the National Zoological Park, the National Herbarium, the National Gallery of Art, the Freer Gallery of Art, the National Collection of Fine Arts, the Bureau of American Ethnology and the Astrophysical Observatory. Closely associated with the government and administering certain government-supported agencies, the Institution is itself not government-controlled.

Collections in its various museums are in themselves a record of the Institution's long service to America's cultural, scientific and technical development. Here are housed the original models of Morse's telegraph, Whitney's cotton-gin, Howe's sewing-machine, Bell's telephone. Here is the flying-machine built by its secretary at the turn of the century, Dr. Sam-

uel P. Langley, with many another aircraft of later date. Here are some of the first steam locomotives to run on American rails.

Stowed in the great loft of the Smithsonian's administration building are scores of thousands of botanical specimens, many of them recording the travels of hardy souls who "saw the West first." On the other side of the Mall, in the National Museum of Natural History, are the massive skeletons of dinosaurs dug out of the rocks in the same West, decades later.

The natural history of the human races who originally peopled North America is richly illustrated in the collections in the same museum, in tens of thousands of skulls and hundreds of thousands of primitive weapons, tools and pottery vessels.

It is impossible to name any phase of science or culture on which scholarly work has not been done by present and past Smithsonian staff members. And the Institution's second century is now just opening.

Science News Letter, August 10, 1946

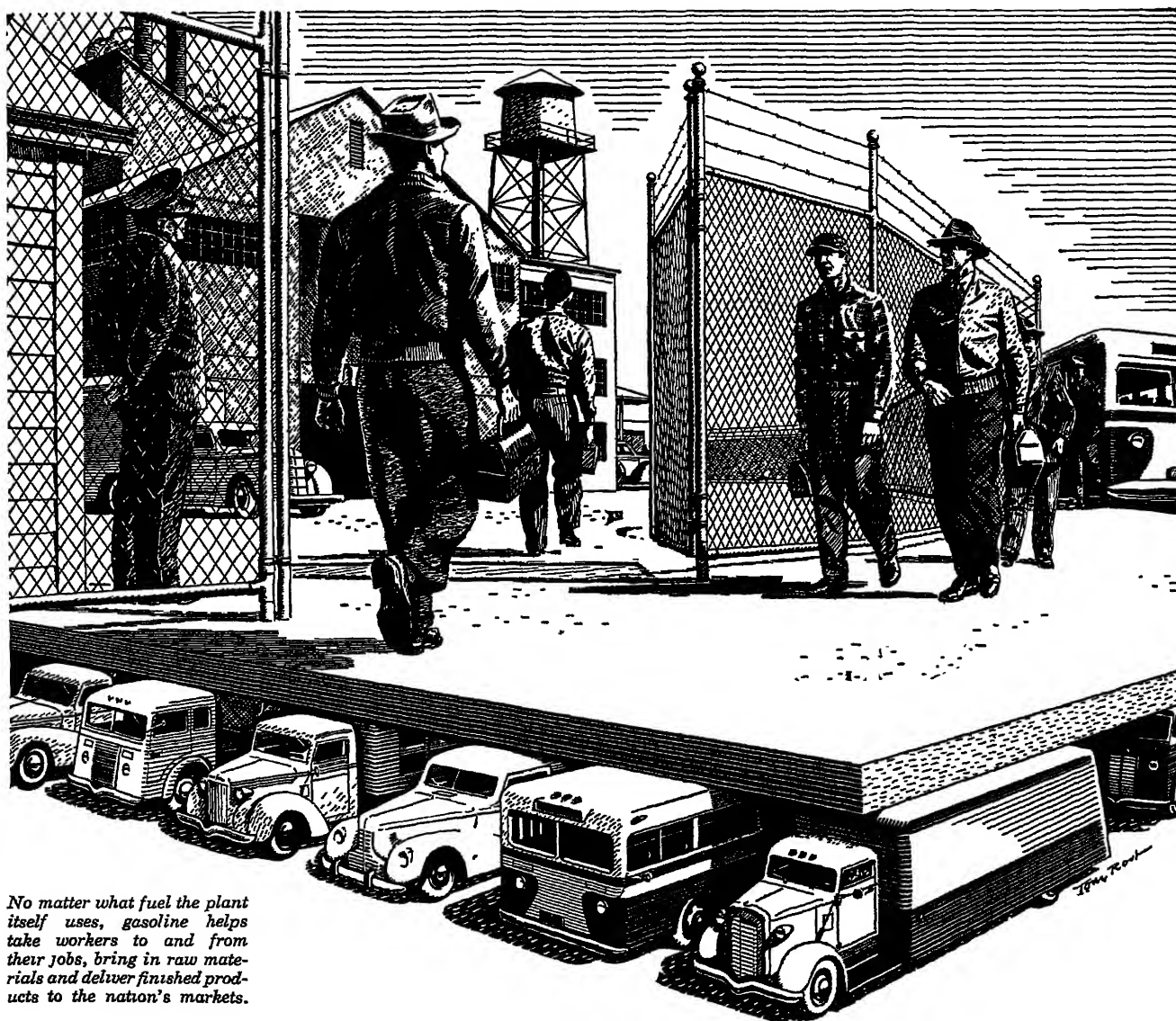
CHEMISTRY

Chemical Industry Medal to Dow

► THE CHEMICAL Industry medal for 1946 has been awarded to Dr. Willard H. Dow, of Midland, Mich., head of chemical companies that bear his name. He pioneered in production of bromine, magnesium, and other products from sea water, and during the war made styrene for synthetic rubber.

Science News Letter, August 10, 1946

The average *person* of 70 has slept enough throughout his life to total 20 years.



No matter what fuel the plant itself uses, gasoline helps take workers to and from their jobs, bring in raw materials and deliver finished products to the nation's markets.

Industry runs on gasoline

IT WOULD be impossible to draw a complete picture of modern industry without including cars, trucks, buses and other types of gasoline-powered equipment. Gasoline transportation is so much a part of the American industrial scene that *everyone* benefits each time its cost is reduced.

During the past twenty years such reductions have been many. By improving their refining processes and using antiknock fluid made by Ethyl, oil refiners have been able to produce gasolines of increasingly higher quality. And each improvement in gasoline has in turn made possible the development of more powerful, more efficient engines to provide better transportation at lower cost.

Because better fuels and better engines depend so much upon each other, Ethyl's research and service

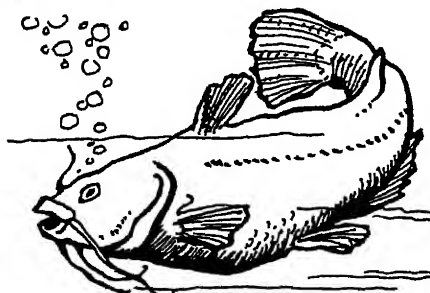
organizations have always worked closely both with refiners who use our product and with engine builders who are eager to get the most out of every improvement in gasoline quality. Ethyl Corporation, Chrysler Building, New York 17, N. Y.

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Awaiting Accolade

➤ **CATFISH!** The word is usually spoken scornfully, as of an inferior creature, little better than the worm he gulps for bait.

Admittedly, things are against the catfish socially. He hasn't much for looks, or grace, or agility, or fighting spirit, like the patrician trout, the lordly bass, even the robber-baron pike. He is content to



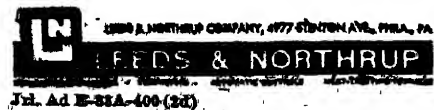
Photo Courtesy Rohm & Haas Co., Phila.

MICROMAX PLOTS CURVES FOR BUSY CHEMIST

Busy with a dozen details of his work with Plexiglas, this chemist is relieved of at least one duty—plotting temperatures of the reaction taking place in the metal cylinder at his left.

After putting the thermocouple in place, he merely runs their leadwires to the Micromax Recorder, and automatically secures temperature curves which are as satisfactory as those he could prepare himself by going through the manual routine of measuring couple emfs.

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dwell in the muddy slums of the aquatic world, snouting in the bottom slime for food and willing to eat almost anything. Only the carp will consent to live in worse quarters than a catfish will put up with. He is the pig among fishes.

That porcine metaphor, however, contains the catfish's vindication as well as his condemnation. For the pig, too, is unbeautiful, delights in mud, gobbles garbage, yet becomes most excellent eating when properly dressed and cooked. And just as the pig achieves a degree of splendor in the big wild boar, there is a catfish that comes very near to nobility—the big channel cat of the larger Midwestern rivers.

In that part of the country, at least, people have learned to appreciate the catfish that comes very near to nobility a really properly fried catfish can taste mighty good. They have made a virtue of necessity, for their rivers yield no trout, and you may have to drive for scores of miles to find even fair bass or pickerel fishing.

Similarly in the South, the catfish becomes a tasty dish in the hands of a cook, especially a Negro cook, who really knows his subject. Negroes, with their combination of poverty and frequent talents for cooking, have made some notable contributions to American cuisine out of once-plebeian, now-patrician meats—shad, for example, and terrapin. Catfish Africaine may yet appear as a featured item on the menus of our best restaurants.

Science News Letter, August 10, 1946

GEOLOGY

Engineers Study Arctic Building Problems

➤ **PERMAFROST**, the permanently frozen ground of the polar regions that covers one-fifth of the earth's land surface, is hazardous territory for building structures, reports of American and Russian research in the Arctic reveal.

U. S. Army engineers constructing northern wartime bases discovered that swelling, subsidence, landslides and icing were among the dangers of building on a frozen surface, while Russian engineers have been studying the problem in Siberia for 20 years.

By changing the ground temperature and mechanical conditions of the earth, buildings on permafrost can bring about their own doom by causing ground thaws or sinking, the reports indicate.

In Siberia, studies of permafrost have

shown that the frozen layer may be only a few feet deep or can in some cases extend several hundred yards down into the earth. In the southern Arctic, the permafrost layer is sometimes buried beneath a thin surface that thaws and freezes with the seasons.

Permafrost is nothing new, much of its present area having been frozen since the Ice Age.

Science News Letter, August 10, 1946

PHYSICS

Near-Zero Cold Goal Of Ohio State Apparatus

➤ A **TEMPERATURE** of within one-thousandth of a degree of the unattainable absolute zero of cold will shortly be achieved in the low temperature laboratory of the Ohio State University that was built secretly during the war.

The magnetic cooling cycle to be used is available in only two other cryogenic laboratories in the United States.

Superconductivity of metals at very low temperatures is also on the research program announced by Prof. Herrick L. Johnston, director, who revealed that the low temperature apparatus, rushed into operation in 1942, did work on the atomic bomb project.

Science News Letter, August 10, 1946



LIQUID AIR—At Ohio State University's War Research Laboratory, a laboratory technician withdraws liquid air from the liquefying apparatus at a temperature of 308 Fahrenheit degrees below zero. Extremely low temperatures played an important part in the University's atomic research for the Manhattan Project.

• Books of the Week •

THE ALKALINE-EARTH AND HEAVY-METAL SOAPS—Stanley B. Elliott—*Reinhold*, 342 p., tables and illus., \$7.50. A book to acquaint research chemists and technologists with the manufacture, properties, and typical applications of the alkaline-earth and heavy-metal soaps.

THE AMERICAN HOSPITAL—E. H. L. Corwin—*Commonwealth Fund*, 226 p., tables, \$1.50. A factual analysis of existing hospital conditions in the light of significant evolutionary trends.

THE CHILD FROM FIVE TO TEN—Arnold Gesell, M. D., and Frances L. Ilg, M. D.—*Harper*, 475 p., \$4. A year by year series of psychological portraits with concrete guidance suggestions, covering the following areas of the child's life: motor characteristics, personal hygiene, emotional expression, fear and dreams, self and sex, interpersonal relations, play, school life, ethical sense, and philosophic outlook.

ENVIRONMENTAL WARMTH AND ITS MEASUREMENT: A Book of Reference Prepared for the Royal Naval Personnel Research Committee of the Medical Research Council—T. Bedford—*British Information Services*, 40 p., tables and illus., paper, 25 cents. A study of air temperature, humidity, etc., with special reference to conditions on board ship. (Also **CHARTS FOR THE CALCULATION OF ENVIRONMENTAL WARMTH**, 45 cents.)

KNOTS AND ROPE: Phototold in 195 Pictures—Fremont Davis and Marjorie Van de Water—*Infantry Journal Press*, 86 p., illus., \$2. Visual instruction, with some lines of text, showing how the rope is useful as a tool and how the most complex knots, hitches, and splices can be easily tied and used.

LEAD REPLACEMENTS IN DINNERWARE GLAZES—H. J. Orłowski and John Marquis—*Ohio State Univ. Experiment Station*, 58 p., tables, paper, 50 cents. A study of the leadless glazes. Ohio State Univ. Studies, Engineering Series, Vol. XV, No. 2.

LET'S COOK: A Manual for 4-H Club Members—*Cornell Univ.*, 64 p., illus., paper, 5 cents, Cornell 4-H Club Bull. 73.

LIPPINCOTT'S QUICK REFERENCE BOOK FOR MEDICINE AND SURGERY: A Clinical, Diagnostic, and Therapeutic Digest of General Medicine, Surgery and the Specialties, Compiled Systematically from Modern Literature—George E. Rehberger, M. D.—*Lippincott*, 1461 p., tables and illus., \$15.00, 13th ed.

THE MAGNETRON AS A GENERATOR OF CENTIMETER WAVES: J. B. Fisk, H. D. Hagstrom, and P. L. Hartman—*American Telephone and Telegraph Co.*, 348 p., tables and illus., paper, \$1. The Bell System Technical Journal, Vol. XXV, No. 2.

MIRACLES FROM MICROBES: The Road to Streptomycin—Samuel Epstein and Beryl Williams—*Rutgers Univ. Press*, 155 p., \$2. A non-technical, full story of antibiotics, the great new highway to human health which science is creating.

PHYSICAL LAND CONDITIONS IN ANDERSON COUNTY, SOUTH CAROLINA—*Government Printing Office*, 46 p., tables and illus., paper, 20 cents. The results of a field survey by E. A. Burgess and party; land-capability tables and recommendations by technicians of the Soil Conservation Service cooperating with the Upper Savannah Soil Conservation District. Physical Land Survey No. 38.

OUR WORLD AND SCIENCE—Samuel R. Powers, Elsie F. Neuner, Herbert B. Bruner, and John H. Bradley—*Ginn*, 684 p., illus., \$2.20, new ed. A textbook in natural science for boys and girls in the early high-school years.

PROCEEDINGS OF THE SOCIETY FOR EXPERIMENTAL STRESS ANALYSIS: Vol. III, No. 2—C. Lipson and W. M. Murray, ed.—*Addison-Wesley*, 166 p., diagrs. and illus., \$5.

SEX PROBLEMS OF THE RETURNED VETERAN—Howard Kitching, M. D.—*Emerson*, 124 p., \$1.50. Information for the

returned veteran and his wife, to help them rebuild their marriage successfully after the emotional upheaval resulting from separation due to war.

TREE-RING HYDROLOGY OF THE COLORADO RIVER BASIN—Edmund Schulman—*Univ. of Arizona*, 51 p., tables and illus., paper, 60 cents. Laboratory of Tree-Ring Research, Bull. No. 2.

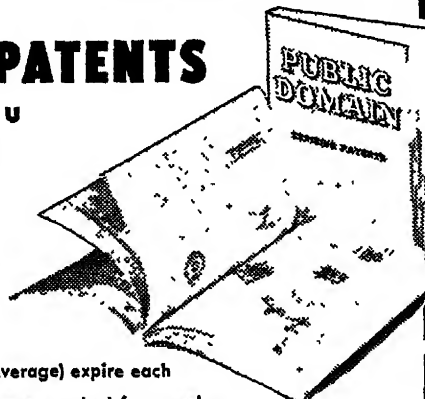
WATCH YOUR STEP Avoid Farm Accidents—*Government Printing Office*, 32 p., illus., paper, 10 cents. A booklet designed to give the farmer an understanding of the problem of accidents on the farm, and to suggest specific measures for its solution. U. S. Department of Agriculture, Misc. Publ. No. 608.

The first *bicycle* was invented 100 years ago by a village blacksmith of Keir, Scotland; the inventor, Kirkpatrick MacMillan, rode the iron-rimmed wheels 70 miles from Keir to Glasgow.

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☛ "PEEK BAGS" save shoppers' time by placing fresh produce in the self-serve category. Made of "wet-strength" paper and fitted with cellophane windows, they permit pre-packaging of fresh greens, and cut down loss through handling.

Science News Letter, August 10, 1946

☛ SCISSORS on wheels can be accurately guided over the cloth by tailors and dressmakers. The primary blade of the shears is straight along its lower edge, and in the same horizontal plane with the lower portion of the roller or wheel, mounted on the handle.

Science News Letter, August 10, 1946

☛ HOME CANNING aid flashes red signal to warn canner of unsafe vacuum sealing. User sets dial for any of the nationally known makes of lids, presses tester down on lid. If jar is safely sealed, the green side rises; if not, the red stays up.

Science News Letter, August 10, 1946

☛ IN-CAR speakers for drive-in theaters are weatherproofed for permanent location on parking ramps and can be used with car windows closed in cold weather. A short circuit affects no more than the two speakers connected to one terminal box.

Science News Letter, August 10, 1946

☛ VERSATILE cabinet is topped by three tray-type shelves supported by



swing-lock uprights. The cabinet can be swung into a flat-top serving table, a three-tiered magazine table, or used as a sick-room cabinet.

Science News Letter, August 10, 1946

☛ ELECTRIC EYE helps keep auto plant air free from carbon monoxide. It releases a magnetic valve operating a pneumatic cylinder which opens up an air scoop, sucking the poisonous fumes from the tail pipe of each car being tested on the assembly line.

Science News Letter, August 10, 1946

☛ COLLAPSIBLE wading pool, of heavy duck fabric colored red outside and green inside, is coated with a synthetic rubber used on portable tanks for storing water in Pacific combat areas. The sun-proof, rot-proof pool is 68 inches in diameter and 16 inches high; it takes only a few minutes to assemble and fill.

Science News Letter, August 10, 1946

☛ COMBINED package and serving dish for individual portions of dry cereal is intended for discard after use. The saucer-like cover that sets downward into the container, leaves space for addition of milk and fruit when removed.

Science News Letter, August 10, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 823. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

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Question Box

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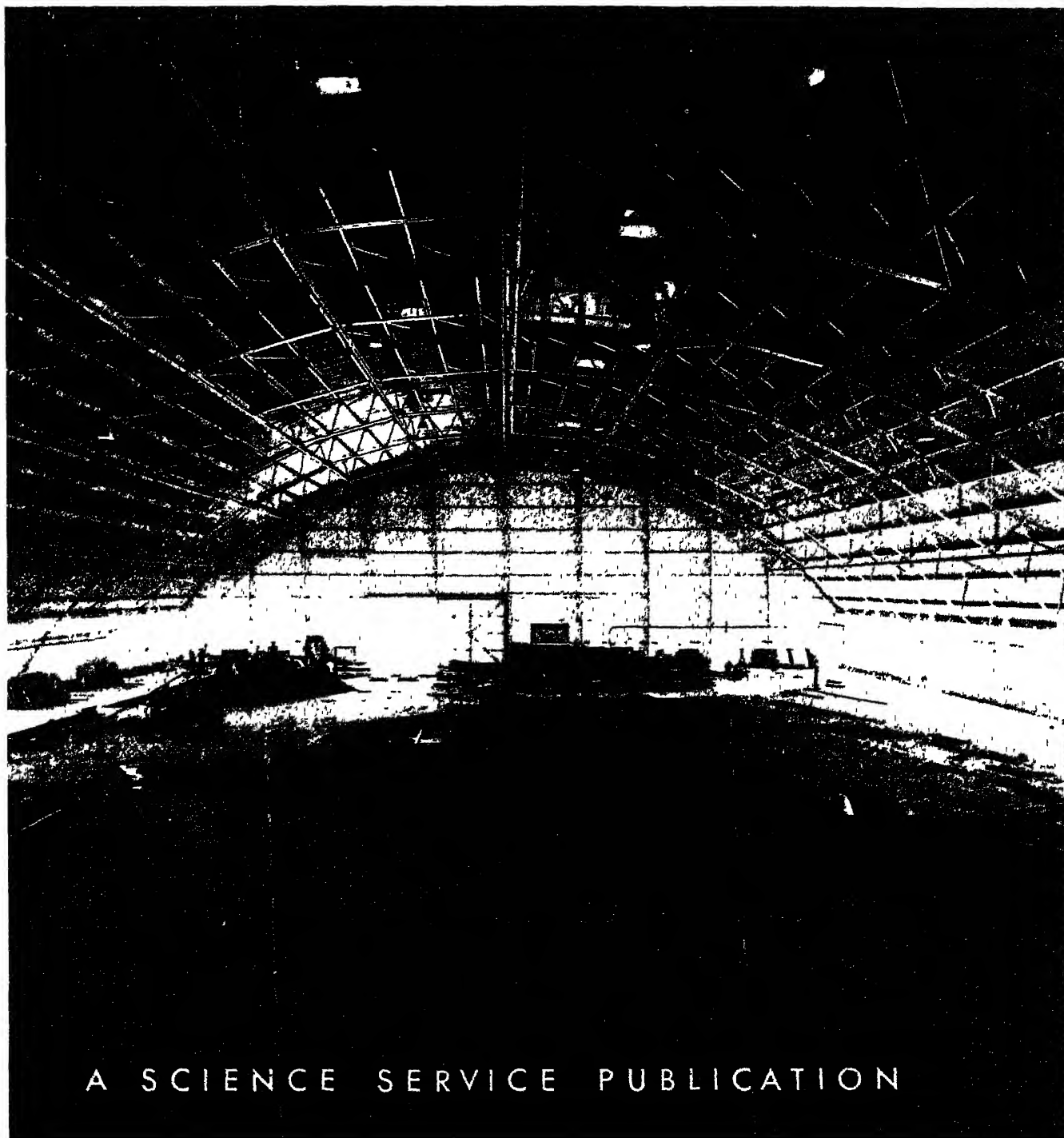
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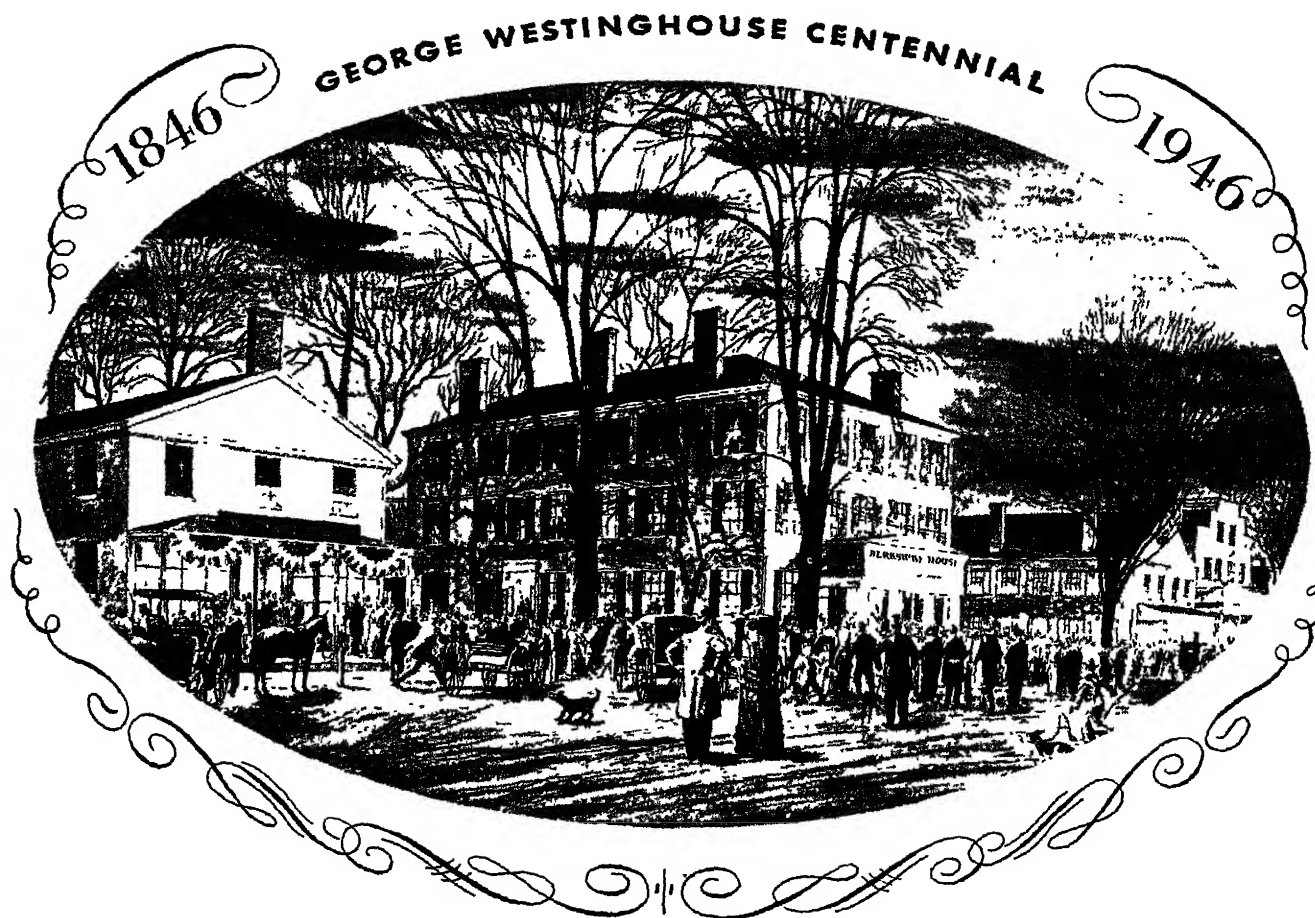
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SCIENCE NEWS LETTER



A SCIENCE SERVICE PUBLICATION



Lighting Main Street

Sixty years ago electric lighting, as we enjoy it today, was unknown. This was because only one kind of electricity was available—*direct current*—which could be transmitted economically for only a short distance.

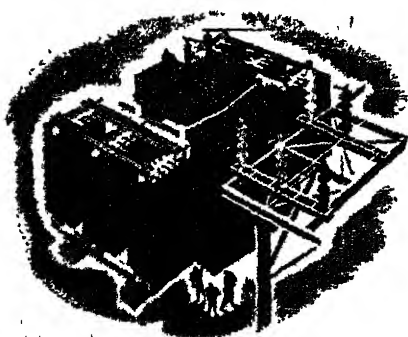
About this time George Westinghouse began experimenting with the "new" alternating current electricity. He soon realized that here was the golden key to a new industrial age—for he found that alternating current could easily be "transformed" to high or low voltage, at will.

Westinghouse reasoned that alternating current could thus be transmitted for many miles at *high voltage*, then reduced to *low voltage* at the point of use.

This great industrial pioneer acted at once. He acquired the rights to manufacture a new invention—the "a-c transformer." He then redesigned it completely and sent his associate, William Stanley, to the outskirts of Great Barrington, Massachusetts . . . to install the first complete a-c transmission system in America.

On the historic night of March 20, 1886, William Stanley closed a master switch and electric lights blazed on Main Street, Great Barrington, nearly a mile away.

George Westinghouse's dream of the long-distance transmission of electricity was well on its way to fulfillment.



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TODAY . . . The Westinghouse Electric Corporation manufactures hundreds of different types of transformers—from thimble-size units for radio receivers to giants with ratings as high as 100,000 kva. Two of the latter type . . . each as big as a six-room house . . . were built by Westinghouse for a large eastern utility to transform the output of a huge power plant soon to be put into service.

Tune in: TED MALONE—Monday, Wednesday, Friday, 11:45 am, EDT, American Network

OCEANOGRAPHY

Undersea Regions Studied

Life and conditions in the vast regions under the surface of the sea, hitherto little known, are important to future planning for peace or war.

By DANIEL WILKES

Science Service Crossroads Correspondent

► THE VAST reaches of water under the surface of the sea are a highway to war or a frontier beyond which scientific conquistadores may enrich the lives of all men.

This is indicated by Comdr. Roger P. Revelle, in charge of the oceanographic section for Joint Task Force One, and in peacetime a staff member of the Scripps Institution of Oceanography at La Jolla, Calif.

While Comdr. Revelle stressed the peacetime aspects of oceanography, he indicated that the sea, which covers about 70% of the earth's surface, cannot be overlooked by nations if means for survival in atomic warfare are being sought. Speaking of this negative side of oceanography, he pointed out that atomic-powered submarines with very long ranges may not be too far in the future. He added, too, that it may be possible to track such submarines by means of their exhaust, which might emit fission products.

Fission products can be tracked in the water. Even now, several members of Comdr. Revelle's staff are making a tracer study of the currents and the movement of radioactive fission products, using vessels equipped with Geiger counters and devices for taking samples of deep water.

The science of oceanography is only about 65 years old and there are only about a dozen important oceanographic institutions in the world. In some respects more is known about the topography of the moon than about the bottom of the sea and of distant stars than of ocean currents.

While the surface of the sea has been man's most important highway for centuries, its great depths and the storms that rage within it and create weather are only beginning to unfold.

During the war a great deal was learned about the extent to which the environment — temperature, weather, plant and sea life—changes at different levels and in different areas of the sea.

One of the methods of study during the war was with new sound devices, such as sonar. In water as in air, the velocity of sound increases with increasing temperature, pressure and salinity.

Using their sound equipment, scientists at the Naval Electronics Sound Laboratory at San Diego found that there is a great temperature change a few hundred yards below the surface. Here there are great waves, somewhat like those on the surface, but much longer and slower moving. The lengths of these waves are up to a few hundred yards, and because of the great distance between their crests, they appear to be flat. Actually these crests are as high as 300 feet. This refutes all ideas that the ocean consists of somewhat stationary layers of water in the sea, with waves at the surface.

The importance of exploring the sea thoroughly is indicated by many practical considerations. It is filled with minerals of every imaginable sort. Salt, already mined from the ocean in important quantities, is present in an abundance sufficient to cover all the continental United States to a depth of nearly a mile. Bromine, essential to making high octane motor fuels, is economically already being extracted from the sea. Each cubic mile of the ocean has a quarter of a million tons of this element.

Weather forecasting, vital in so many of man's activities, is dependent to a great extent on knowledge of the sea. The movement of water, vertically and horizontally, and differences in temperature influence the humidity of the atmosphere creating pressure areas, rain, great air movements.

In many ways the sea is more spectacular than the land. The greatest depression, Mindanao Deep, off the coast of the southern Philippines, is 35,400 feet deep, while the highest mountain on land, Mt. Everest, is 29,000 feet. If irregularities of the earth's crust were smoothed into a rounded ball the earth would be covered by 7,500 feet of water.

If the threat of atom bombs compels all future naval vessels to be submersible, they may play hide-and-seek with

enemy craft by taking advantage of "deaf spots" known to exist in ocean water. These areas of different water density, caused by combinations of currents, make it impossible to detect the presence of submarines or other submerged large bodies by the echo-searching methods usually found dependable, declares Capt. Logan McKee, in charge of ship design in the Navy's Bureau of Ships.

Special maps of ocean stratification may enable submarines to find and hide under or behind these numerous "deaf spots" as bodies of troops ashore now use topographic relief maps to find and use ravines and valleys for concealment from enemy observation and protection from gunfire.

A strong hint that one of the principal factors in driving all combat ships to shelter under the surface may be the deadly radioactivity released by atom bombs was contained in Adm. W. H. P. Blandy's statement. He pointed out the grave psychological problem involved in training men to go on fighting after the ship had become contaminated with fission products.

Concurring in Adm. Blandy's opinion, Col. Stafford Warren of the Army added that while present-day fire-fighting suits will keep radioactive materials from lodging on the body and getting into



Joint Army-Navy Task Force One photograph

DERBY HAT—From the air the Baker Day atomic explosion took the appearance of a derby hat for a brief instant as water, spray and steam boiled skyward out of Bikini Lagoon.

lungs and digestive tract through the nose and mouth, they do not stop direct irradiation.

Continuing in action on contaminated ships would necessitate calling on the men to risk a very high casualty rate from a new and therefore terrifying cause. In the history of American wars,

volunteers have never been lacking for ultra-hazardous missions, such as underwater demolitions and parachute jumps. Nevertheless, it is felt that asking men to stick at their posts and be "rayed" to death is a serious responsibility to impose on any officer.

Science News Letter, August 17, 1946

MEDICINE

Penicillin for Skin Anthrax

Studies during the war prove skin anthrax can be cured by penicillin. Former treatments used were anti-anthrax serum and cutting out sores.

➤ RECOVERY of 25 patients with skin anthrax by penicillin treatment was achieved at Camp Detrick, Md., where biological, or germ, warfare studies were conducted during the war. Presumably the patients acquired the disease during efforts to develop anthrax as a weapon or to develop defenses against it in expectation of its use by the enemy.

The first three cases occurred before December, 1944, although dates of occurrence of the others and how the patients got the disease are not mentioned in the report by Maj. Harold V. Ellingson, Capt. Paul J. Kadull and Capt. Henry L. Bookwalter, Army, and Lieut. Calderon Howe, Navy, in the *Journal of the American Medical Association*, (Aug. 3).

In three of the patients, anthrax germs got into the blood as well as the skin sores. In the past this was considered a sign that the patient might not recover. These three patients, however, did get well through the penicillin treatment.

Anthrax germs disappeared from the skin sores in 24 hours or less in 22 of the patients, the Army and Navy doctors point out. In spite of this the sores went through the stages of getting larger, deep red, bleeding, breaking of the blisters, and drying with a tough black crust typical of anthrax before the days of penicillin treatment.

This suggested that a "tissue damaging factor" was produced by the germs before treatment was begun. Such a factor was subsequently discovered and will be reported by other scientists.

Anthrax is a disease of cattle which humans get from handling infected hides or hair. Aside from any potential use as a weapon in war, it is an important medical problem in the wool and leather industry. It used to kill 13 of every 100 attacked.

Cutting out the sores was the standard treatment years ago, but deaths ran high. Antianthrax serum, arsenical drugs and sulfa drugs were later used.

First report of penicillin treatment, by which three women wool workers were cured, was by Drs. Franklin D. Murphy, Alfred C. La Bocetta and John S. Lockwood, of the University of Pennsylvania. That report was made in December, 1944 (*SNL*, Dec. 16, 1944). The Army and Navy doctors at Camp Detrick, however, had already given penicillin to their first three patients but for security reasons no report was made public.

Science News Letter, August 17, 1946

CHEMISTRY

Acetylene May Be Made From Natural Gas

➤ ACETYLENE gas, best known in America for its use in welding, may soon be commercially produced in this country from natural gas instead of from calcium carbide as at present. A German process of making it from coal gas is one of the important discoveries of American scientists investigating chemical secrets of former enemies.

In addition to its use in the oxy-acetylene flame for welding and cutting metals, acetylene is the starting point in the synthesis of a large number of organic compounds, and its manufacture in America was a \$15,000,000 industry in prewar days. Acetic acid is made from it in great quantities by a catalytic hydration process. Acetic acid is well known in vinegar but its greatest use is in making plastics of the cellulose acetate type, including cellulose acetate silk, the best kind of rayon.

The German methods for deriving

acetylene from coal gas are said to be more efficient than American processes. The United States has large quantities of natural gas, of which only a relatively small amount is now used for the production of chemicals. Chemists feel that the German methods are adaptable to the production of acetylene from natural gas, giving America another source of this important basic chemical.

Further investigation of the German process is now being made by American chemists overseas. The findings will be made public through the Office of the Publication Board, U. S. Department of Commerce.

Science News Letter, August 17, 1946

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FORESTRY

Timber for the Future

American timber lands, if handled properly, can meet needs. But growing own trees is most practical plan for lumber business.

➤ A FOREST resource appraisal just completed answers the question relative to America's ability to meet current and future needs in wood products. The answer is "yes," in spite of heavy war drains, if modern practices and policies are followed.

A group of experts representing the American Forestry Association has completed a three-year survey, and recently reported to the Association's committee which met recently at Roscommon, Mich., and which is drafting plans for the restoration and development of the country's tree-growing lands.

The report declares that from the nation's 465,000,000 acres of commercial forest land, 44,000,000,000 board feet of saw timber could be taken annually, and that pulpwood needs could be met without reducing the forest productivity. But, it states, to harvest this much wood without serious damage to the forests will require many changes in woods practices and policies.

One difficulty in establishing widespread modern scientific forest management is due to the percentage of tree-growing areas in private ownership. Over 90% of the products of the forests now come from privately-owned forest lands, although these lands contain only 55% of the merchantable timber, the report states. The other 10% comes from the 45% of merchantable timber under control of the federal government, states and other political subdivisions.

Privately-owned lands bore the brunt of the four-year war harvest of 131,400,000,000 board feet of lumber and over 59,000,000 cords of pulpwood, farm woodlands in the east being heavily cut. To assure some degree of control over future cutting, the program committee will propose a plan of action for consideration at the fall meeting of the American Forest Congress to be held in Washington, D. C., Oct. 9 to 11.

Lumbermen Grow Own Trees

➤ WITH THE nation's lumber bins emptied by four years of war, lumbermen, farmers and private forest owners

not only must, but can now well afford to take the advice of conservationists they have been ignoring for 80 years.

It is now more practical for them to meet the shortage by growing their own trees than it is to buy up virgin timber, declares J. B. Woods, director of a three-year inventory of the nation's forest resources.

The great economic advantages to be gained by private forest owners today, by proper forest management, added Mr. Woods, was the point most stressed throughout the three-day session of the meeting. On the basis of the inventory which he made for the American Forestry Association, the committee drafted a program of restoration and development for the country's tree-growing lands. To arouse public support of the program, it will be presented to the American Forest Congress.

One thing the inventory shows is that we have "contracted our frontiers," said Mr. Woods. It is still possible to increase production to meet the postwar emergency, but it must be done by growing new trees. Old forest stands cannot long support the heavy cuttings necessary.

To assure this, one of the points which will be proposed to the Congress is a vigorous nationwide expansion of advice and technical assistance to the four million owners of small forest properties, which comprise 57% of the commercial forest area of the country. "Tree Farm" and "Trees for Tomorrow" movements will be encouraged.

Believing that "good forestry practice begins at home," the committee is sponsoring adoption by states of forest practice laws. These would be similar in some ways to the old Code laws, resulting 10 years ago from the NIRA, the first attempt at nation-wide controls over lumber manufacturers in the interest of conservation. Coming from the states, and made up by the people who are closer to the problems, it is the belief of the committee, Mr. Woods explained, that they will be more effective than federal administration.

It is the opinion of Mr. Woods that unless this shortage is met quickly, the

lumber industry will lose parts of its war-gained market back to wood-substitute building materials.

Science News Letter, August 17, 1946

AERONAUTICS

Navy's "Project Squid" Studies Rockets and Jets

➤ UNDER THE name, "Project Squid," five universities are conducting a two-year research program to develop liquid rocket and intermittent jet propulsion devices for the Navy.

Institutions participating in the \$2,000,000 studies set up by the Navy's Office of Research and Inventions at the request of the Bureau of Aeronautics are Cornell, Purdue, Princeton and New York Universities and the Polytechnic Institute of Brooklyn.

Fundamental research in aerodynamics, chemistry, mathematics and physics will be included in the comprehensive studies, believed to be the largest peacetime program of scientific research and development in American history.

Headquarters of "Project Squid" have been established at Princeton with Dr. Hugh Stott Taylor, dean of the Princeton Graduate School and chairman of the Princeton department of chemistry, serving as chairman of a six-man policy committee. Pending appointment of a full-time director of the program, Prof. Robert N. Pease of Princeton is acting project director.

Science News Letter, August 17, 1946

MEDICINE

African Sleeping Sickness Cured with New Drug

➤ SCIENTISTS in the interior of tropical Africa, armed with a new chemical weapon, have won another victory in their fight to control the dreaded plague, African sleeping sickness.

Early cases of the fatal disease, long thought to be incurable, and previously battled by attacks on its carrier, the tsetse fly, have been cured in one week of treatment with the new drug. P-arsenosophenylbutyric acid is its name.

Dr. Harry Eagle, of the U. S. Public Health Service, in cooperation with the Sleeping Sickness Services of the Belgian Congo, French Equatorial Africa, French West Africa, the Gold Coast, Nigeria, treated 319 human cases of one type of African sleeping sickness be-

fore the central nervous system had become infected.

The success of the treatment varied with the total amount of the drug administered, but it was estimated that more than 90% of the early cases can be cured within a period of one week if the standard total dosage set by this experiment is used. Treatment with other drugs may have to continue for as long as 12 to 15 weeks, according to some published reports.

Doctors administering the new drug to natives found also that injections into the muscles of the patients proved to be as effective in treating the disease as the previous method of injection into a vein.

Mass treatment of sleeping sickness patients throughout tropical Africa may be simplified even more when the studies now in progress of the treatment of more advanced cases are reported.

Science News Letter, August 17, 1946

PHYSIOLOGY

Living 29,000 Feet Up

➤ TWO NAVY volunteers lived without supplemental oxygen for 30 minutes in conditions simulating an altitude of 29,025 feet while doctors kept valuable records on living in high altitudes, Commodore J. C. Adams, chief of the division of aviation medicine of the Navy's Bureau of Medicine and Surgery, announced.

Lt. (jg) Walter S. McNutt, Jr., Jefferson, Texas, and hospital apprentice Carlton R. Morris, Farmerville, La., actually were in a 10 x 10 foot pressure chamber at the Naval Air Station, Pensacola, Fla., when they "climbed" 23 feet higher than Mt. Everest. The atmospheric conditions in the room were those of a higher altitude than man has ever

before survived without added oxygen.

The experiment, dubbed "Operation Everest," built up the simulated altitude from sea level conditions to the record height in 32 days and tested the adaptation of the human body to anoxia, the decreasing supply of oxygen encountered at high altitudes. Two other volunteers, hospital apprentice Earl D. Wilkins, Jr., Dorchester, Mass., and pharmacist's mate Horace C. Hertel, The Dalles, Ore., blacked out after the conditions went above 27,000 feet. They were revived with additional oxygen.

After living at the record altitude conditions for half an hour on July 30, the "high living" volunteers were given oxygen and pressures were lowered to simu-

late 50,000 feet. The chamber was gradually returned to sea level conditions at the end of the operation.

Mt. Everest, for which the high-altitude experiment was named, rises 29,002 feet above sea level in the Himalaya Mountains in northern India, and no climbers have ever reached its peak, the highest in the world.

Terming the experiment "a new chapter in altitude physiology," Commodore Adams pointed out that this study is the first scientific record of effects on the human body of conditions at such high altitudes for any length of time.

Careful records were kept of the men's temperatures, blood pressures and weights during the experiment and special devices recorded their heartbeats as they slept at night.

Recreation for the "guinea pig" volunteers in the more-than-a-month of living in the pressure chamber included reading books on mountain climbing.

Science News Letter, August 17, 1946

MEDICINE

Report First Adult Survivor of Rare Disease

➤ A "UNIQUE" case in medical history, the first adult known to have survived an attack of the rare disease, toxoplasmosis, is reported by Dr. Jerome T. Syverton and Dr. Howard B. Slavin, of the University of Rochester, N. Y., School of Medicine and Dentistry, in the *Journal of the American Medical Association* (July 27).

Only one other patient, a child, is known to have survived this ailment. The germ that causes the disease is a large one-celled parasite called toxoplasma. The disease itself was unknown to medical scientists before 1939. Since then, only 35 cases have been reported, three of them in adults.

The case reported by the Rochester doctors was discovered by accident. While most of the previously reported cases showed signs of brain injury or of inflammation of the membranes covering the brain, the Rochester patient had symptoms more like those of typhoid fever or some other intestinal infection.

Blood tests and the course of the disease led the doctors to suspect trichinosis, so they cut out a tiny piece of a leg muscle and examined it under the microscope. Instead of finding the worm that causes trichinosis coiled in a cyst in the muscle, they found toxoplasma organisms.

Science News Letter, August 17, 1946



FLYING HIGH—Respiration is being checked on volunteer for Operation Everest, Navy's experiment to test adaptation of the human body to anoxia, the decreasing supply of oxygen encountered at high altitudes. Both doctors wore oxygen masks while in the altitude chamber.

ENGINEERING

Model Typhoon Defense

See Front Cover

➤ NEARING completion in an airplane hangar is a huge model that will help engineers plan a scientific defense for the Navy's new harbor at Guam against the ravages of Pacific typhoons.

Built on a scale of 1 to 300, the model is 120 feet square and will accurately reproduce waves, surges and other hydraulic conditions in the Guam harbor. The model is being built by the California Institute of Technology and the Navy's Bureau of Yards and Docks. It is shown in the hangar on the front cover of this SCIENCE NEWS LETTER.

Apra harbor at Guam is to be a permanent naval base, probably the first harbor of its size to be so completely planned. Covering nearly seven square miles, the new installation will replace wartime construction and be built on the basis of studies made of the model.

The \$275,000 study that includes the model began a year ago with a 40-foot-square model on the campus of the California Institute of Technology. This earlier laboratory structure was large enough to give an accurate picture of the harbor for placing buildings and the

breakwater, but it was not adequate for studies of the inner harbor and defense against the destructive typhoons.

A huge basin with a concrete bottom and two-foot steel sides, the new model will even have beaches of real sand when finished. Pneumatic wave machines simulate the harbor's water motion, while an oscillograph records the movements of the miniature waves. A strong light beamed on floating button reflectors permits time photograph records of currents in the model harbor.

Special data are being collected at Guam to insure the accurate reproduction of the harbor site.

From studies of the model will come the placement of slips, docks and dry-docks in the Navy's Apra harbor so as to best protect ships of the fleet and the harbor installations from the ocean's movements.

The model studies are being directed by Prof. Robert T. Knapp, of the California Institute of Technology, under the supervision of Rear Adm. John J. Manning, chief of the Bureau of Yards and Docks.

Science News Letter, August 17, 1946

ASTRONOMY

New Comet Jones Discovered in Puppis

➤ A NINTH magnitude comet has been discovered in the southern constellation of Puppis, the ship's stern.

Too faint to be seen with the naked eye, but visible with high-powered binoculars, the comet was spotted at 1:20 p.m., EST, on Aug. 6 by A. Jones of Timaru, New Zealand. I. L. Thomson of the New Zealand Astronomical Society cabled news of the discovery to Harvard Observatory, clearing house for astronomical information in the Western Hemisphere.

When found, Comet Jones had a right ascension of 7 hours, 56 minutes, and a declination of minus 13 degrees, 15 minutes. Its daily motion is three minutes of time eastward and fifteen minutes of arc southward.

Mr. Jones, after whom the comet will be named, is one of the most skillful observers of variable stars in the Southern Hemisphere. His variable star observations are regularly contributed to the international headquarters at the observatory at Cambridge, Mass.

Science News Letter, August 17, 1946

SEISMOLOGY

Earthquake's Epicenter

➤ THE EARTHQUAKE that shook the Dominican Republic and deluged its coastal towns with a sea wave on Sunday, Aug. 4, had its epicenter under the sea off the island's northeast coast. Seismologists of the U. S. Coast and Geodetic Survey, who used data assembled telegraphically by Science Service from nine observatories all the way from Alaska to Puerto Rico, said that a submarine fault in the rocks of the sea bottom off the Gulf of Samana was the apparent cause of the disturbance.

The quake began at 12:51.1 p.m., EST, on Sunday, and there were two heavy aftershocks on Thursday, Aug. 8, besides many lighter ones throughout the week. The epicenter was in latitude 19.3 degrees north, longitude 69 degrees west. This is a spot on the sea bottom nine miles off the eastern end of the Samana peninsula.

The Coast and Geodetic Survey seis-

mologists also traced the epicenter of the earthquake that caused some damage and loss of life in northern Chile on Friday, Aug. 2, to a spot near the town of Copaiapo. This shock occurred at 2:18.7 p.m., EST.

Data on both earthquakes were furnished by observatories of the Jesuit Seismological Association at St. Louis; Georgetown, Xavier and John Carroll Universities and Weston College; Pennsylvania State College; the Seismological Observatory at Pasadena, Calif., and the stations of the U. S. Coast and Geodetic Survey at College, Alaska; San Juan, P. R.; Honolulu, Tucson, Ariz.; and Ukiah, Calif.

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Benzadrine, used in treatment of certain depressive conditions such as alcoholism, has been successfully used as an antidote for sleeping pill poisoning.

PSYCHOLOGY

National Sovereignty Not Greater Than Security

➤ THE REACTIONS in human minds all over the world are more important just at the moment than what happens within the atomic bomb.

Psychologists have just offered the expert opinion that the idea of national sovereignty does not have such a strong hold on the American people that it would stand in the way of international control of atomic energy.

It is true, a committee of the Society for the Psychological Study of Social Issues reports, that "national sovereignty" is a cliché, a pat phrase or a stereotype. But it can be changed when, as in the case of atomic energy and its possibilities for destruction, it no longer gives assurance of strength and security.

The psychologists argue that international friendship and understanding can be cultivated, that neither war nor peacefulness is inborn in man, that liking and trusting of other peoples as well as hatred can be learned.

Science News Letter, August 17, 1946

AGRICULTURE

Harvesting Machine Saves Sweet-Potato Vines

► MEAT AND MILK can be produced from thousands of tons of a farm product now wasted—sweet-potato vines. This has been made possible through the development of new harvesting machines by U. S. Department of Agriculture engineers.

Sweet-potato vines are highly nutritious as stock food, but because they cling to the soil with little roots produced every few inches, no practical machine-harvesting method has hitherto been devised.

The new method does the job in three stages. First, a sliding shoe holds the vines down while a rolling blade cuts them into manageable lengths. Next, a flat blade just under the surface sweeps the vines into windrows atop the cultivated hills.

Finally, a revolving drum beset with receding fingers picks up the vines. As they are carried over its top the fingers withdraw into the drum. At this point they are picked up by a slatted conveyor and carried to a trailer for removal.

The vines are run through a chopping machine and fed into a silo for storage until needed.

Science News Letter, August 17, 1946

SOCIOLOGY

Ten Reasons Why Punishing War Criminals Will Fail

► PUNISHMENT of Japanese and German war criminals "will increase the probability of World War III," Dr. Donald R. Taft, University of Illinois sociologist, believes.

Predicting failure for the punishment of World War II war criminals, Dr. Taft declares, "If we can think less of punishing war criminals and more of reducing international tensions, there is possibly a chance for avoiding war."

Writing in the *American Sociological Review* (Aug.), he says that the value of punishing the war criminals must be judged in terms of its effect on starting another war.

The Illinois sociologist lists ten reasons why he believes the punishment of war criminals will be a failure:

1. The punished will feel they are being judged by war criminals because of their acts such as the atomic bombings.

2. Punishment is being inflicted by war conquerors and not "peers" of the punished.

3. The social approval of criminal acts is greater than execution in the minds of some of the punished. Goering, facing probable execution, is said to have declared he would follow Hitler again if he were to have the chance.

4. More war criminals will escape punishment than will be punished.

5. Other criminal acts, such as dangerous doctrines and discrimination, will go unpunished.

6. Punishment by victors may appear unjust to former enemies and potential supporters of the punished.

7. If nationalism survives in Germany and Japan, it will tend to make the punishment of the war criminals ineffective.

8. Punishment alone cannot change antisocial attitudes to social attitudes.

9. Punishment that expresses hatred is ineffective.

10. Individual punishment of war criminals distracts attention from the need to attack the basic causes of wars.

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MEDICINE

Streptomycin Effective For Influenzal Meningitis

► STREPTOMYCIN is destined for a life-saving role in yet another deadly disease, influenzal meningitis, it appears from studies reported by Dr. Hattie E. Alexander and Dr. Grace Leidy, of Columbia University's College of Physicians and Surgeons, in *Science* (Aug. 2)

Compared with sulfadiazine and serum, now used together in treatment of the disease, streptomycin is at least one hundred times as effective in protecting mice.

Encouraging results have been obtained in treatment of 10 human patients with the disease, the Columbia doctors report.

Influenzal meningitis used to be 100% fatal. With the advent of sulfa drugs and serum, the mortality has been reduced to about 30%. Hope of reducing this mortality still further and saving more lives prompted the doctors to study the action of streptomycin against the germ, *hemophilus influenzae*, type B, which causes influenzal meningitis. This is not the germ, or virus, which causes influenza, however.

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IN SCIEN

INVENTION

Device to Arrest Engine Exhaust Flames

► AN ENGINE exhaust flame arrester, particularly for aircraft, was awarded patent 2,401,806. Lynn A. Williams, Jr., Northfield, Ill., received the award, and he has assigned it to the Stewart-Warner Corporation of Chicago.

It is a device to prevent the burning of exhaust gases at the outlet end of aircraft engine exhaust pipes. The flame created is usually due to the combining of the discharged carbon monoxide with oxygen in the air. It has relatively little importance in commercial and private flying, but great importance with military planes active at night because the flaming tail gives away the craft's position.

The device is designed to reduce the temperature of the exhaust gases enough so that they will not ignite in the air. It consists of several rows of in-take tubes in fan-shaped arrangements that scoop up air to cool the gases within a special section of the exhaust tube. A damper determines whether the exhaust gases travel by way of the special cooling tube or discharge through the ordinary route.

Science News Letter, August 17, 1946

PHYSICS

Nuclear Release Old as Sun's Heat

► RELEASE of nuclear energy, the process that smashed Jap cities, sank Navy ships at Bikini and promises a new world in peace or war, is as old as the sun's heat, Dr. Emilio Segre, University of California physicist, points out.

An old story in nature, nuclear reactions create the sun's heat, he explained.

"Moreover, it has been known for many years that the radioactive substances contained in the crust of the earth play a most important part in maintaining the temperature of the interior of the earth at its present level," Dr. Segre stated.

"The great achievement of the atomic bomb work," he said, "is not so much to have released nuclear energy, as to have released it in large quantities and under controllable conditions."

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E FIELDS

WILDLIFE

To Count Squirrels Count Nuts They Eat

► THE LAST word on how to count squirrels is to count the less elusive nuts and acorns they feed on.

Such is the theory of a state-wide census program of the Missouri Conservation Commission, being undertaken because of hunters' complaints last year that a lot of time was wasted looking for squirrels that weren't there.

Reckoning that under-nourished squirrels are in no condition to bear young in the spring, Commission members conceived the idea of placing seed traps under sample trees in different parts of the state in order to measure the annual squirrel food crop.

Rule-of-thumb experience by Missouri hunters in previous years suggested existence of a definite relationship between squirrel food and hunted squirrels.

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PHOTOGRAPHY

Lie-Detector for Library Research Work

► A "LIE DETECTOR" for Shakespeare, designed to aid library research work, may be used to detect fingerprint differences and show up forgeries.

The device for revealing printers' errors in microfilmed copies of early editions of Shakespeare's works was invented by Dr. Charlton Hinman, research fellow at Folger Shakespeare Library.

The technique which Dr. Hinman finds speeds up his work by 50 times could perhaps be applied also to the detection of counterfeits, in reconnaissance work by the Army and Navy to detect a change in enemy fortifications, or for any work requiring the high-speed detection of differences between two supposedly similar objects.

Two copies of the page to be compared are first perfectly imposed on a screen, by use of a half-silvered mirror. Flashed alternately on the screen, all words identical in the two copies remain motionless. Passages, words or letters that are different are instantly detected by a bright flickering. In this way, Dr.

Hinman can note all differences between two pages in one minute, a job which formerly took him an hour.

As the first step in the process, micro-filmed copies of a page or map are mounted on one glass slide, and the copies to be compared with them are mounted on another slide. With two micro-projectors set at right angles to each other, the two copies of the object are focussed on the screen together. By transmitting the image from the copy directly behind the half-silvered mirror and reflecting the image of the copy located to one side, two pictures go to the screen from exactly the same point.

Alternating of the two images on the screen starts when two sectored occulting discs geared together are set in motion. Controlled by a rheostat, the speed of alternation can be varied by the operator. The bright flickering will reveal differences as small as variation in inking between the copies.

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METEOROLOGY

Midget Batteries Power Balloon Weather Stations

► CANDY-BAR-SIZED batteries are now powering small radio transmitters in balloons that soar up to 12 miles above the earth gathering weather data.

Approximately four inches in length and one and one-half inches wide, the inch-thick batteries were developed by the Army's Signal Corps Laboratories in conjunction with several industrial organizations. Energy from these lead-acid batteries operates the radiosondes that gather figures on humidity, temperature and pressure as the balloon goes aloft.

Vacuum packed, four in a set, the batteries come in a dry, "precharged" state and are activated by an acid solution electrolyte by puncturing the container with a hollow steel rod. This allows the acid to be sucked up from a jar through a synthetic rubber tube attached to the rod.

The container is opened by a key that winds up a strip below the top of the can, and the excess acid is poured off. The midget battery is then ready for use.

When the hydrogen-filled balloon bursts at high altitudes, sometimes as high as 15 miles above the earth, the sensitive equipment parachutes earthward, continuing the signals that record weather data.

Science News Letter, August 17, 1946

MEDICINE

Cancer Linked to Female Hormone

► THE ROLE that estrogenic or ovarian hormone plays in the production of cancer is indicated in two medical reports published in the *Journal of the American Medical Association* (July 6).

In a paper by Drs. L. Halberstaedter and A. Hochman of Jerusalem, Palestine, the artificial menopause was induced by irradiation of the ovaries in the case of 60 women suffering from cancer of the breast and its metastases. Of these, 34 or 56% benefited from this treatment. The improvement due to the interruption of estrogenic secretion is of short duration, it is reported, since vicarious estrogenic secretion from other sources than the ovaries intervenes.

What is believed to be the first report of the occurrence of endometrial cancer, which is malignancy in the mucous membrane lining the uterus, in a woman undergoing prolonged treatment with estrogen is reported by a group from the Massachusetts General Hospital and Harvard, consisting of Dr. Maurice Fremont-Smith, Dr. Joe V. Meigs, Ruth M. Graham and Helen H. Gilbert.

Science News Letter, August 17, 1946

GENERAL SCIENCE

Radio Insulation Inventor Wins Stalin Award

► FOR THE discovery of a new dielectric substance that may revolutionize the manufacture of insulation material, Prof. Bentsion Vul, well-known Soviet physicist and head of the laboratory of dielectrics in the Institute of Physics of the USSR Academy of Sciences, has been awarded the Stalin prize.

The new substance, barium titanite, possesses a dielectric constant, a number which rates its ability as a non-conductor, several times higher than that of usual dielectrics. By offering a high resistance to wide temperature changes, the new substance promises to furnish the most stable insulating material ever developed for radio and electrical industries.

During the war several hundred thousand high-frequency condensers, made from a less stable magnesium and calcium titanite insulation material developed by Prof. Vul, were produced by Soviet industry and used in the manufacture of radio equipment.

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SOCIOLOGY

Forever Hungry World

Too many people is real world problem, not just too little food. Along with industrializing countries, populations must be educated to limit births.

By MARTHA G. MORROW

➤ THE TROUBLE that causes a starving world is not alone too little food but too many people.

Fertility that plows and reaps the plains of the earth fills the world to overflowing with more and more human beings with ever-open mouths.

"The welfare of mankind is balanced on the two great realities of birth and death. It cannot be too often emphasized that where low living conditions and increasing numbers push a hungry people toward starvation, relief which lowers death rates without a corresponding lowering of birth rates must in the end compound disaster."

Thus does Guy I. Burch, tall, lean Washington scientist and director of the Population Reference Bureau, advise a world combating the greatest famine in all its history.

Every power-grabbing group, wheth-

er a democracy or dictatorship, wants to grow by pure increase in numbers into a majority. Mussolini cried for more people. Hitler offered bonuses for large families. American cities today vie with each other for increase in population. To reproduce and fill the earth to overflowing with one's own kind seems to be an emotional hangover from primitive times.

Yet this increase has resulted in chronic undernourishment for a vast majority of the earth's people. Today, last year, a decade ago, there simply was not enough food to take care of the world's hungry horde. During so-called normal times two-thirds of the people in the world suffer from undernourishment.

This year's total world farm output of food, in terms of calories, will be only about 5% less than the prewar 1935-39 average. Yet when allowance is made for the net increase in

world population during the war years, the per capita world production will be about 12% less, estimates of the U. S. Department of Agriculture show.

More People Than Before War

It might be imagined that after such a destructive conflict as World War II there would be fewer people in the world than before the war. This does not happen to be the case. While the war has destroyed tremendous amounts of wealth, natural resources and means of industrial production, Mr. Birch figures that the demand for these facilities because of population increase has risen some 7%.

Want of the necessities of healthful living—of food in sufficient quantity and quality, of sanitary conditions and of proper medical care—caused the untimely death of from 20,000,000 to 30,000,000 human beings a year even before World War II. Thus about as many die from want in one "peaceful" year as were killed during the five years of war.

The majority of the people of this world are pitifully poor and must do without many of life's necessities as well as most of its luxuries. Even before this war four out of five of the earth's breadwinners failed to earn each week enough to buy what \$10 would have bought in the United States during 1925 to 1934. More than half of the world's people have a real income of less than \$4 per week per breadwinner, estimates Colin Clark, British authority on international levels of living.

Fewer People Per Acre in U. S.

In prewar times the average worker in Italy and Japan had only about one-fourth as much to spend on his family as the typical American worker.

Uninformed Americans may believe that their higher level of living is due to their ingenuity and intelligence, but facts point to another reason. There are only 250 persons for each square mile of arable land here in the United States, while in Italy there are almost 900 and in Japan over 3000 persons for each square mile of arable land.

The mineral resources of these countries, on the other hand, in no way compare with those of the United



U. S. Dept. of Agriculture photograph

Official U. S. Navy photograph

PLENTY AND WANT—There is just not enough food such as the lush grain on the left to feed this hungry world. Millions of people, like the starving Okinawan child at right, suffer from malnutrition.

States. The United States has more than 60 times as much iron ore per person as Japan, for instance, and nearly 200 times as much coal.

The average breadwinner in Germany before World War II could buy only half as many of the necessities and luxuries of life for his family as a worker in the United States. Germany's reserves of iron ore per person were less than one-fourth as large as ours. Her reserves of coal per capita were about one-sixth as great as ours. There were about three times as many people for each square mile of arable land in Germany as here in the United States.

Before inflation took over in China and raised the price of everything sky-high, each week the average breadwinner could buy only as much as \$1.40 would purchase here in America. But one-fifth of the people in the world live in China while only one-eighteenth of the earth's population resides in the United States where a breadwinner has an average income of \$28 a week—about 20 times as great.

In India one out of four dies on or before his second birthday. Feed India enough to keep her babies from dying and within 100 years there would be 12,000,000,000 Indians or more. That is five times the number of people on the earth today.

Growth Throughout World

This suicidal increase in population is not occurring just in so-called backward countries, but also in those that have been industrialized. In these the length of life is ever increasing while the number of children brought into the world continues to be large.

The USSR and tiny Puerto Rico head the list of countries throughout the world as far as population increase is concerned. With birth rates far surpassing death rates, these two countries could double their populations about every 30 years.

There are nearly 12 times as many people for each square mile in Puerto Rico as there are in the United States, yet there the birth rate is twice as high. It has changed little since the island came under the American flag, yet the death rate has been cut in half.

Our fellow American citizens in Puerto Rico, tiny island bursting at the seams with people, eat less than one-third as much meat, eggs, milk, cheese, vegetables and other protective foods as the average white person in the

United States. They get only about one-half as much to eat as Negroes in our Southern cities.

"If Puerto Rico explodes in population, it may cause little disturbance in world politics. Only the inhabitants of that island may suffer. But if Russia's already huge population explodes into a program of territorial expansion," Mr. Burch says, "this would shake world civilization to its foundations."

Today there are urgent appeals for famine relief for China's 450,000,000 people, for India's 400,000,000, for Europe's 500,000,000. Other countries like the Philippines, the Dutch East Indies, parts of Africa and the Near East cry for food.

But the crisis has only in part been brought about by the destructive war. The world is chronically hungry. Every year around 20,000,000 more people are added to the world's population—20,000,000 more to feed, yet few additional natural resources are being discovered to add to the earth's dwindling supply. Famine will eternally endanger a majority of the earth's people unless the number stops growing so enormously each year.

World Must Be Educated

The world must be educated to conserve human resources as well as natural resources. Mr. Burch's studies show that the people of the world cannot be freed from want and war by programs of industrialization and technology unless accompanied by a humane world program for limiting the number of people on this earth.

This is the basic world problem as Mr. Burch sees it. If science lowers the death rate without a corresponding decrease in the birth rate, millions of babies each year will be born only to starve. A program of population limitation must be realistically studied by the society of nations. Some means for educating the world toward this end must be adopted before there can ever be hope for enough food to give each individual a life-sustaining share.

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AERONAUTICS

NACA and Army Design XS-1

➤ MAN'S FIRST attempt at flight faster than sound will be made soon in a Bell Aircraft-Army XS-1, a plane that follows design knowledge developed by the

National Advisory Committee for Aeronautics, it has been revealed.

The XS-1 has been built by the Bell Aircraft Corporation under contract with the Army Air Forces. It is based on high-speed design principles provided by the NACA, with specifications worked out by the NACA, the Army and Bell in cooperation.

The airplane incorporates the latest supersonic knowledge. It is the result of studies made on models conducted in NACA wind tunnels, from the early stability tests in seven-by-ten-foot tunnels and a spin tunnel to the later transonic investigation in an eight-foot high-speed tunnel.

Drag and thrust information through the upper transonic range was furnished chiefly by studies of free-falling test bodies released from high altitudes. These streamlined bombs exceed the speed of sound, and have furnished the most accurate knowledge of drag at sonic speed and the thrust required to overcome it.

Just how fast the rocket-powered XS-1 will be able to fly will probably depend on how the controls react near the speed of sound, NACA officials state. This, rather than the drag and thrust that can be calculated, constitutes the real unknown. The "transonic" region, from roughly 500 to 900 miles per hour, is difficult to duplicate in a wind tunnel due to shock waves that "choke" the tunnel. NACA wind tunnels have provided accurate information up to 96% the speed of sound, and this indicates that the XS-1 will include rapid and severe changes in control characteristics.

YOUR HAIR AND ITS CARE

By Oscar L. Levin, M.D.
and Howard T. Behrman, M.D.

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Do You Know?

Many of the 150,000 *cancer deaths* each year in this country are unnecessary.

The strength of a *scar* following the healing of a wound is dependent upon the amount of vitamin C in the diet

Vinegar added during the canning process helps retain the bright red color of fresh beets.

Colchicine, the drug used to develop new varieties of plants, is being successfully used in the treatment of gout.

The output of *iron ore* in Italy last year was only 5% of what it was before the war.

Surplus and undergrade *potatoes* fed to livestock every year in the United States amount to about 5% of the total crop.

Like snakes and turtles, *lizards* are reptiles and are hatched as miniature adults rather than developing from a larval stage

Heating *flour* in the oven at about 170 degrees Fahrenheit for half an hour will kill any flour weevils present, no matter what stage of development

Cows grazing on weed-infested pastures are almost certain to give off-flavored, low-quality milk; dairy specialists recommend taking the cows off grass two or three hours before milking.

One of the many *enemies* encountered in mahogany logging is the marine borer teredo; once it starts to work it can completely riddle the rafted logs within a few weeks.

Long-keeping *rye bread* was baked in Germany during the war in an oven placed inside a steam boiler from which some of the steam entered the oven; the bread had no crust.

Insect repellent, developed by the Naval Medical Research Institute and known as Repellent 448, will keep flies, mosquitoes and other pests away for 36 hours in temperate climates; it can be used on clothing and animals.

The XS-1 has already been tested in the air about a dozen times but without its own power. It was taken aloft by bombers and released to glide and dive downward. Controls are reported to function satisfactorily in these tests. When its rocket engines are installed and the plane is ready to fly under its own power, it will be tested in the air by the Army at gradually increasing speeds until its airworthiness is established. Then the attempt will be made, at very high altitude where the air is rare and resist-

ance is less, to beat the speed of sound, approximately 760 miles an hour at sea level.

In all, three models of the XS-1 will be built. One will be flown by the Army, one retained by Bell Aircraft for experiments, and one retained by the NACA. Rockets have travelled much faster than sound, but the XS-1 is the first American pilot-carrying plane designed for sonic and supersonic speeds. Other nations are trying, but none has yet succeeded.

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CHEMISTRY

Famine as a Weapon

Chemicals developed during the war which might be used to promote famine in the event of another war are being put to excellent peacetime use.

➤ FAMINE WILL join with atomic bombs and man-made pestilence to make World War III an apocalyptic horror, if mankind becomes so mad as to start fighting again. And while it may be possible to protect factories, and even dwellings, against atom bombs by hiding them underground, famine cannot be escaped in that way because crops have to be up on the surface in the sunlight.

Visions of famine as a weapon are proved to be realizable at will even now, by publication of details of biological warfare experiments carried on in the deepest of wartime secrecy at Camp Detrick, Md. Dr. A. J. Norman of Iowa State College, who was in general charge of the work, joins with a group of colleagues in presenting results of the researches in the Chicago University's *Botanical Gazette* (June).

The chemicals that can be used to spread famine by ruining an enemy's crops are complex organic compounds. One of them has already come into general use as a weed-killer under the convenience-designation of 2,4-D. The Camp Detrick experimenters tested the effects of about 1,100 of these, and found that some of them are even more toxic to plants than their prototype.

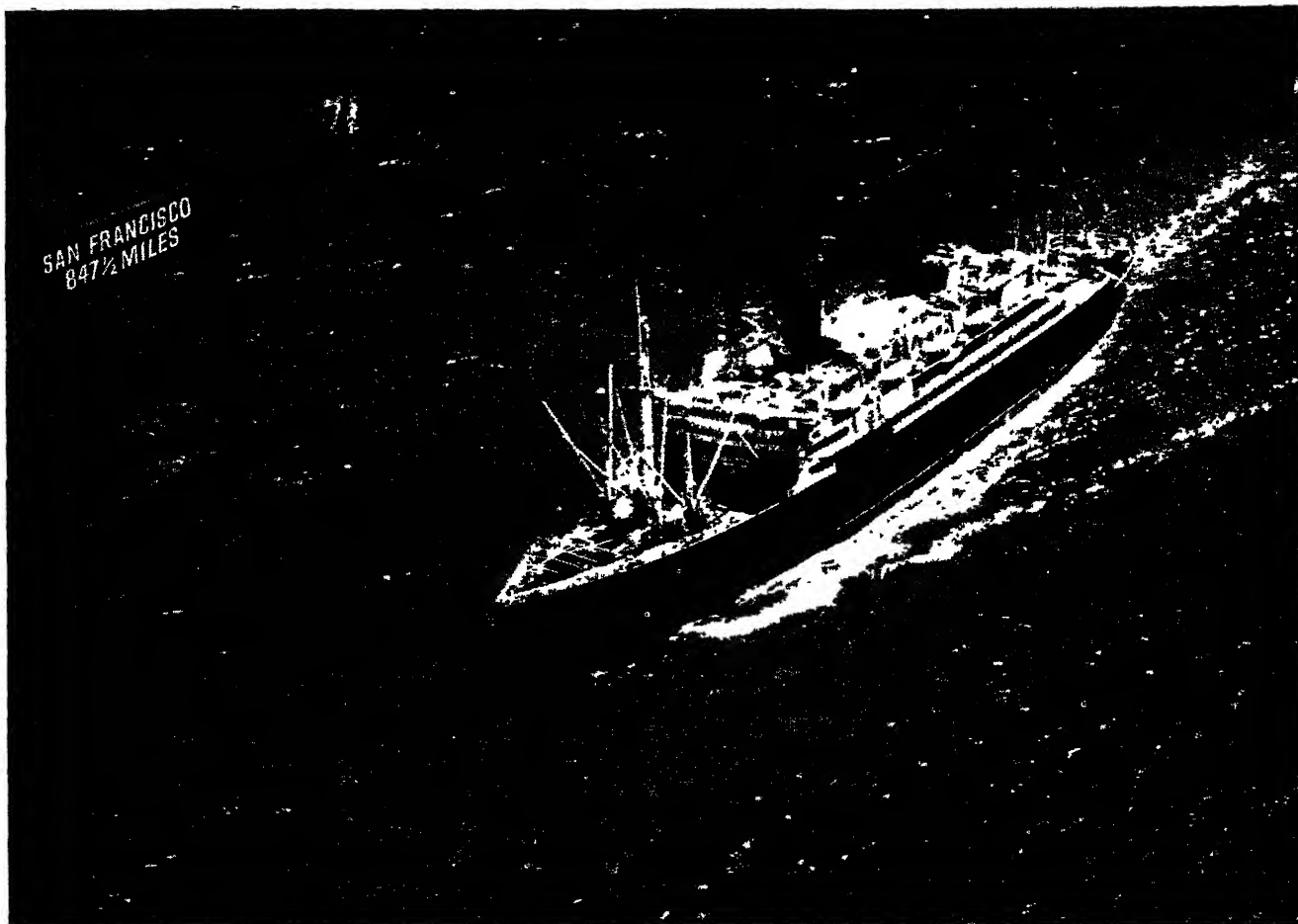
It would not be necessary to kill all the plants in a field to make the crop a failure, the experiments showed. One drop of a very dilute solution of some of the chemicals falling on a leaf would cause the stem to twist and often also to develop lumpy, tumor-like galls. The plant might survive, but it would live

on only as a twisted, stunted cripple, unable to produce its full quota of food. Spraying tops can seriously affect underground parts, too; in some of the experiments potato tubers were badly damaged by chemicals used on the vines above them.

Contact with the chemical does not need to be prolonged to work a great deal of mischief. In some cases the plant begins to become sick and crippled in as little time as an hour after the fatal drop has fallen on a leaf. And if the chemical is dissolved in oil instead of water it will stick to the leaf and do its poisonous work, even if a heavy rain comes up immediately after the oil-drop has fallen and stuck.

A considerable number of food plants was used in the experiments—enough to indicate pretty thoroughly that no crop can be considered safe. Among them were corn, wheat, barley, oats, potatoes, tomatoes, soybeans, kidney beans, cabbages and turnips. Had either Germany or Japan launched a biological warfare drive against us (and it was known that both had ideas of doing so) a counter-attack against their crops would have followed very quickly.

Now that these compounds are not needed for the grim business of war they can be used for purposes of peace. One of them, 2,4-D, is already on the job as a weed killer, where others may presently join it. Others may be employed in lighter doses to stimulate plants rather than kill them. Among possible uses along this line are (*Turn to page 110*)



Developed during the war, Loran projects long-distance radio beams to guide ships on lanes charted by radio-electronics.

Loran—"highway signposts" for the seas and skies!

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Loran (short for LOnG Range Navigation) uses radio waves which hug the earth's surface instead of going off into space. Two sets of stations, about 300 to 400 miles apart, send out impulses to a Loran receiver on shipboard like the one shown above. It then shows the ship's exact position.



RADIO CORPORATION of AMERICA



Familiars of Satan

➤ **RATS** APPEAR in many late medieval and early modern paintings as familiars of warlocks and witches, and even of the Devil himself—and quite appropriately so. There is hardly any living creature that follows man more ubiquitously, damages his possessions in more fiendishly ingenious and persistent ways, or is capable of bringing death to him in more terrifying form.

Ancient Babylonians had a god of flies—Beelzebub, the Baal of Buzzing Things. The concept of such a disgusting deity probably arose out of a primitive instinct to propitiate that which you find you cannot combat. That they had no god of rats may seem strange, until it is realized that they had no rats. Rats,

though probably Asiatic in origin, did not achieve their present world-wide distribution until the rise of world-wide commerce. Rats are natural beach-combers; and they'll jump ship wherever the pickings ashore look good.

Rats' destructiveness to property is reckoned in simply fantastic multiples of millions. Any good-sized city could easily maintain a municipal university on what rats devour, spoil and set fire to.

Rats live in filth and are menaces to health generally. Their greatest danger comes from the fact that the fleas which they harbor are the natural carriers of that most terrible of Asian scourges, bubonic plague.

Man has long been almost helpless in the face of rats, for they can be kept down only at the cost of constant and highly expensive eradication campaigns. Within the past few years, however, two rodenticides have been developed that at least seem to provide man with proper weapons in the hitherto hopeless fight. They are the terrifically toxic 1080, unsafe for any but professional use, and ANTU, which the householder may handle with impunity to himself and devastating effect on the rats.

Science News Letter, August 17, 1946

BIOPHYSICS

Ultraviolet Lamp Kills Germs in Refrigerator

➤ **DEATH** COMES quickly to mold and bacteria in household refrigerators equipped with a new tiny ultraviolet lamp.

The walnut-size lamp, that costs a nickel a month to operate, is double-acting: it gives off bacteria-killing rays and also produces ozone which circulates within the cabinet. It is a Westinghouse product.

Research proves, Westinghouse engineers state, that the bactericidal radiation and ozone wave lengths emitted by the lamp assure odorless refrigerators, improve sanitation, enable longer preservation of food, and check the growth of mold and bacteria on the food.

The lamp, about the size and shape of an automobile headlight bulb, is a midget brother of the large Westinghouse Sterilamp in tubular form up to 45 inches in length that is used to halt bacteria in the food industry, and to minimize infection by airborne bacteria in schools and hospitals.

A step-down transformer is used with it to reduce the voltage of the household current to the 12 volts needed by the three-and-a-half watt lamp. A specially-designed tungsten filament within the lamp has long life because it glows for only three seconds each time the refrigerator compressor starts. This is just long enough to start the arc that produces the ultraviolet rays as it passes through a mercury vapor atmosphere.

Science News Letter, August 17, 1946

From Page 108

increasing the yield of apples, preventing the premature dropping of fruit, and killing potato vines before harvesting the tubers.

The research program carried out at Camp Detrick was first suggested by Prof. E. J. Kraus of the University of Chicago, and some of the first work was done in his laboratory there, just across the street from the site of the first nuclear-energy pile. Some of the later experiments were also carried out at the U. S. Department of Agriculture's experiment station at Beltsville, Md. A considerable number of compounds used, which had never previously been made, were synthesized by Prof. Melvin S. Newman at Ohio State University.

Science News Letter, August 17, 1946



BACTERIA BLASTER—This miniature lamp was designed especially to provide bactericidal ultraviolet protection and air-purifying ozone in home refrigerators. Its designer is shown checking the ultraviolet produced by the lamp in a refrigerator cabinet.



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• Books of the Week •

ANAEROBIOSIS IN INVERTEBRATES—Theodor von Brand—*Brodynamica*, 328 p., tables, \$4.80. A survey of the occurrence of anaerobiosis, of anaerobic metabolism, and of data on the adaptations of invertebrates to anoxic conditions, and on the origin of their anaerobic functions.

APES, GIANTS, AND MAN—Franz Weidenreich—*Univ. of Chicago*, 122 p., tables and illus., \$2.50. An outline of modern scientific opinion on the physical development of man, including a survey of the various theories of evolution, a chapter on the races of mankind, and one concerned with the development of man's brain.

BIBLIOGRAPHY OF THE GEOLOGY AND NATURAL RESOURCES OF NORTH DAKOTA—Chrissie E. Budge—*North Dakota Research Foundation*, 214 p., paper, free. North Dakota Research Foundation, Bull. No. 1.

THE BIRDS OF SAN JOSE AND PEDRO GONZALEZ ISLANDS, REPUBLIC OF PANAMA—Alexander Wetmore—*Smithsonian Institution*, 60 p., illus., paper, 30 cents. Smithsonian Miscellaneous Collections, Vol. 106, No. 1.

THE CEDARTOWN, GEORGIA, METEORITE—Stuart H. Perry—*Smithsonian Institution*, 3 p., illus., paper, 15 cents. Smithsonian Miscellaneous Collections, Vol. 104, No. 23.

COMMUNITY CANNING CENTERS—*Government Printing Office*, 86 p., tables and illus., paper, 30 cents. Information on the establishment and operation of community canning centers based on information obtained from authorities in the field of canning. The canning techniques presented are for approved steam-pressure and water-bath methods and are based on ungraded products packed in a clean, sanitary manner.

EMULSION TECHNOLOGY Theoretical and Applied—*Chemical Pub. Co.*, 360 p., tables and diagrs., \$6.50, 2nd ed. Discussions of viscosity, surface-film, surface-tension, phase-volume, solid particles, adsorption, hydration, etc. This new edition contains a section on the theory of emulsions, a list of emulsifying agents, and authoritative data on methods of formulating practical emulsions in many industrial fields.

ENGLISH-FRENCH AND FRENCH-ENGLISH TECHNICAL DICTIONARY—Francis Cusset—*Chemical Pub. Co.*, 590 p., \$5.00. A handy volume compiled to help the technical man in reading French.

THE GARDENER'S BUG BOOK: 1000 Insect Pests and Their Control—Cynthia Westcott—*Doubleday*, 590 p., illus., \$4.95. A manual on insect pest control including description of the plant enemies which attack flowers, shrubs, trees, lawns, vegetables, and fruits, and giving data on the basic factors of successful control and the equipment for dusting and spraying.

HOME-BUTTERMAKING—D. H. Nelson—*California Agricultural Extension Service*, 14 p., illus., paper, free. California Agricultural Extension Service, Circular 68.

HOMENAJE AL PROFESOR ARQ. JOSE A. MICHELETTI—*Universidad Nacional del Litoral*, 33 p., illus., paper, \$1.50. Serie: Universitaria, No. 37.

INTO THE FREEZER—AND OUT—Donald K. Tressler, Clifford F. Evers, and Lucy Long—*Avi Publishing Co.*, 223 p., tables and illus., \$2.50. A handbook for those interested in the home freezing of foods, for those using local locker plant facilities, and for those operating locker plants.

PROCEEDINGS OF THE AMERICAN PHILOSOPHICAL SOCIETY—*Am. Philosophical Soc.*, 161 p., paper, \$1.00. Ground-Plans and Prints of the Univ. of Virginia, 1822-1826, by Edwin M. Betts, The Antiquaries and Sir Henry Spelman by Robert Schuyler; Origin of the Moon and its Topography by Reginald Daly, Heroes of Sumer by Samuel Kramer, and The Colonial Impulse by Howard Mumford Jones, Vol. 90, No. 2.

TURTLES COLLECTED BY THE SMITHSONIAN

BIOLOGICAL SURVEY OF THE PANAMA CANAL ZONE—Karl Patterson Schmidt—*Smithsonian Institution*, 9 p., illus., paper, 15 cents. Smithsonian Miscellaneous Collections, Vol. 106, No. 8.

UNITED STATES LIFE TABLES AND ACTUARIAL TABLES 1939-1941—Thomas N. E. Greville—*Government Printing Office*, 153 p., tables, \$1.25.

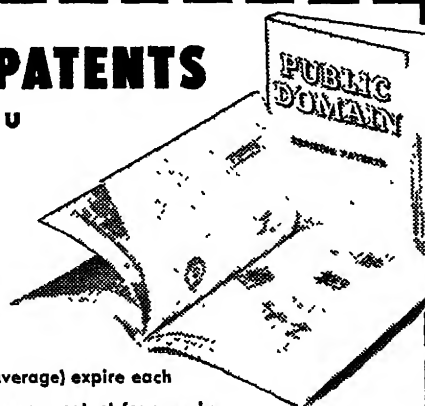
WE DROPPED THE A-BOMB—Merle Miller and Abe Spitzer—*Crowell*, 152 p., \$2.00. The eye-witness story of what happened over Hiroshima and Nagasaki, told by the radio operator of the *Great Artiste*, one of the three planes that flew on these history-making missions.

An experimental plant in which ultraviolet light pasteurizes the milk at the same time it enriches the vitamin D content is claimed to be in operation by German scientists.

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☼ **FUNNEL** and stand, home-made, makes easy the job of filling packages for home freezing. A rim at the top of the funnel keeps liquids from spilling, the mouth of the funnel extends into the package so that foods do not touch inside sealing edges of the liner.

Science News Letter, August 17, 1946

☼ **HOT WATER** heater, a stoker-fed coal-burner, works automatically for at least 30 days, and uses cheap grades of fuel. When a thermal control regulator calls for heat, driving mechanism starts and moves coal into the retort.

Science News Letter, August 17, 1946

☼ **SUN SURREY** is a three-wheeled beach car, which seats two riders, who operate bicycle pedals while sitting side-by-side. Behind the seat is a large locker, and an awning to keep off the sun.

Science News Letter, August 17, 1946

☼ **AUTOMATIC** coin-changer makes change for dimes and quarters. If a quarter is deposited in a candy bar vending machine, it sends back the merchandise and four nickels in change. It also accepts nickels for exact payment and can detect and reject slugs.

Science News Letter, August 17, 1946

☼ **IMPROVED** all-purpose electric mixer is of light-weight plastic and can easily be held in one hand. The stainless steel



beater and shaft will mix, whip, or beat ingredients in small jars and glasses as well as in regular mixing bowls.

Science News Letter, August 17, 1946

☼ **RUBBER HEEL**, with an improved shock cushioning device, entraps air between two layers of rubber. The soft upper portion contains upwardly slanted air pockets staggered with downwardly slanted pockets in the harder tread layer. Lower layer, when worn, can be replaced separately.

Science News Letter, August 17, 1946

☼ **POCKET-SIZE** sharpener resets dulled scissors in a few two-way strokes on each blade. The carborundum cutting stone, set in a flat nickel-plated angle guide, is moved up and down on top of the blade. Any of its four surfaces can be used.

Science News Letter, August 17, 1946

☼ **NEW TYPE** nussed rafter for small houses has four basic members plus two bracing ones, and saves lumber by eliminating heavy bearing partitions. It can be fabricated on the job or mass-produced in a shop.

Science News Letter, August 17, 1946

☼ **SPIRAL-CUT** saw blade, for wood, light metals and plastics, is a fine 10d with spiral-running teeth the full length. It resembles somewhat a type of wood screw that has widely separated threads. It can cut in any direction without changing the position of the saw frame.

Science News Letter, August 17, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 324. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

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How may lumbermen be assured of sufficient lumber for the future? p. 101.

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Does the U. S. have more people or fewer people than Italy per arable mile? p. 106.

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Do rats cause a great deal of destruction in the world, and in what ways? p. 110.

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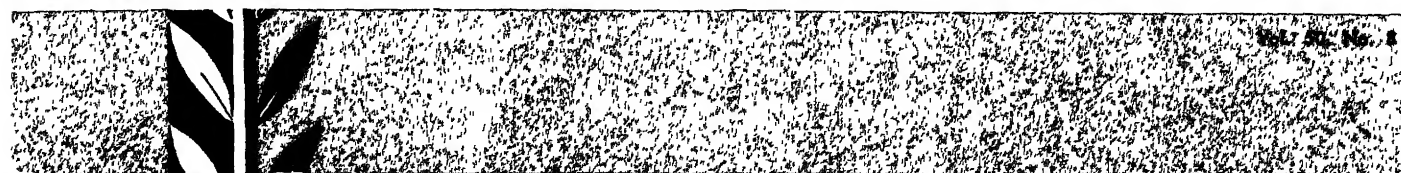
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THE WEEKLY SUMMARY OF CURRENT SCIENCE - AUGUST 24, 1944



A SCIENCE SERVICE PUBLICATION

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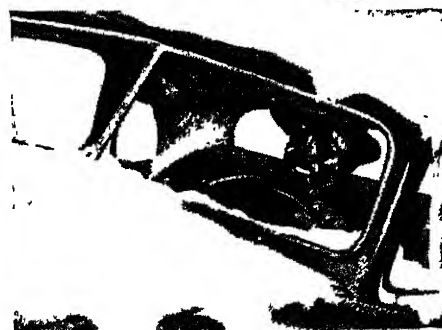
In blending their premium-quality motor oils, many oil companies use Monsanto lubricant "additives." In a sense, these chemicals are the vitamins of oil technology. They add to even the best natural oils a greater ability to guard against damage to bearing surfaces . . . eliminate power losses . . . reduce the formation of destructive carbon . . . suspend sludges, so they drain away when oil is changed. In a new car, or one that's not so new—in tractors, trucks, buses, Diesels—addi-

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ORDNANCE

Exploring Upper Air

V-2 rockets from Germany are serving Army, Navy and scientific groups in research into atmospheric conditions above the earth. Aerojet missiles also are being fired.

➤ GERMAN V-2 rockets, on peaceful missions seeking new knowledge for science, will be sent streaking through the skies over the desert at White Sands, N. M., until at least next April, according to a tentative schedule announced by Lt. Col. J. G. Bain, chief of the Guided Missiles Branch, Rocket Division, U. S. Army Ordnance.

From a stock of 25 completely assembled V-2's, 10 have been fired, and 10 more will be sent into the upper atmosphere by early Feb., 1947. The others will probably follow in the next two months, but a decision will be made early next year on whether to construct more of the German weapons or turn to other designs in future exploration of the region around 100 miles overhead. Col. Bain said.

Of an original request for 100 complete V-2's, only 25 were obtained. Some parts are available but others will have to be manufactured in the U. S., using captured German plans, if it is decided to continue the V-2 program after the first 25 are expended.

Meanwhile, an anti-aircraft guided missile has been fired in Utah, first of 60 standard Aerojet rocket-propelled units scheduled for firing this year, the Army has announced.

Called "gapa," ground-to-air pilotless aircraft, the missiles are built by the Boeing Aircraft Co. Pencil-slim, the latest postwar weapon is 10 feet long.

The tenth Nazi missile actually to be fired at White Sands was instrumented by a group including the Army Air Forces and headed by Dr. W. G. Dow of the University of Michigan. This winds up the first round of rockets with the scientific groups each getting another V-2 in the second series beginning in October, under present plans.

The eleventh rocket, to be fired Oct. 3, will be a second one for scientists of the Naval Research Laboratory, Washington, D. C. The Navy scientists directed the data-recording work on the V-2 shot off June 28, but got only a partial record of the flight on their instruments.

The twelfth V-2 will be in the scientific hands of the Johns Hopkins Laboratory of Applied Physics, Silver Spring, Md. This group sent instruments up in the record-breaking flight of the eighth V-2, July 30, and troops are still searching the desert for records of the trip, recorded on instruments that fell separately from the rocket.

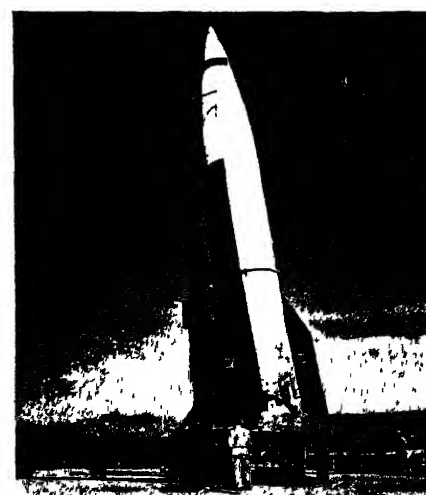
Princeton University scientists will be in charge of the 13th rocket, scheduled for firing Oct. 31, and other V-2 shoots are listed at two-week intervals into early 1947.

Dr. E. H. Krause, head of the rocket sonde section of the Naval Research Laboratory's research section, is chairman of a V-2 technical group in charge of the scientific use of the Nazi weapons being fired at White Sands.

Science News Letter, August 24, 1946



GAPA—This heretofore secret guided missile has been fired for the first time over the salt fields of Utah. It is pencil-slim, 10 feet long, and has been designed as potential defense against attack by enemy aircraft.



U. S. Army Air Forces Photos

RESEARCH MISSILE—V-2 rockets have been fired higher than 100 miles into the stratosphere. Special instruments replace TNT in the warhead and may be lowered by parachute after ejection. These instruments furnish data for scientists.

SEISMOLOGY

West Indies Quake=8.25

Only three recorded tremors have been rated higher than the earthquake with its serious aftershocks which rocked the West Indies.

➤ THE EARTHQUAKE that rocked the West Indies Aug. 4, and with its aftershocks killed more than 65 people, was a harder shock than the famous Japanese quake in 1923 that claimed nearly 100,000 lives, seismologists at the United States Coast and Geodetic Survey have stated.

The tremor that centered in the Caribbean off the Dominican Republic has been rated at 8.25 on the scale devised by Dr. Beno Gutenberg of the Seismological Laboratory of the California Institute of Technology, Pasadena, Calif. Another 8.25 quake was the devastating San Francisco shock of 1906, and only three recorded tremors

have been rated higher. The three greatest shocks, listed as 8.5 on Dr. Gutenberg's scale, were on the border between Ecuador and Colombia in South America in 1906, in China in 1920 and in Chile in 1922. The Jap quake in 1923 was rated 8.0.

Dr. Gutenberg's rating system, regarded by many seismologists as the most accurate, is the only scale measuring the intensity of the earth's tremors by instruments. It uses the amplitude of a quake's motion as recorded on a seismograph to rate the shock, and a Gutenberg figure of 7.5 will be a tremor big enough to wreck any city. Higher numbers are based on the extent of the quake.

Tremor on Aug. 8 that raised the toll from the quakes was one of more than 150 aftershocks recorded after the first big tremor. These following quakes may continue a month or several months more with varying intensity, seismolo-

gists declare. While not looking for any more as big as those already recorded, the earthquake authorities say that these "hangover" tremors are unpredictable.

The longest period of aftershocks ever recorded was for the quake at Helena, Mont., in 1935 that was followed by tremors for a full year.

Emphasizing that location is the all-important factor in the toll from quakes, seismologists say that the West Indies disturbance killed relatively few people because the epicenter of the shock was approximately ten miles at sea. The area affected was not densely populated and the many flimsy buildings helped keep the death list relatively small for an earth-rocking of that magnitude.

Among modern earthquakes, the Chinese shocks in 1920 claimed 180,000 lives for the highest fatalities, but China's historians have recorded a quake in 1556 with an estimated 830,000 deaths.

Science News Letter, August 24, 1946

ENGINEERING

Shielded from Electricity

► SHIELDED buildings to protect delicate electrical experiments and tests inside from electrical influence without are not new, but in two under construction unique methods are employed.

One is a Navy hangar, a \$2,000,000 project just started at Patuxent River, Md., to provide facilities for delicate tests on radar and other electronic devices installed in aircraft.

The other is a group of laboratory buildings, some completed and others under construction at Nutley, N. J., in which the Federal Telephone and Radio Corporation will conduct experiments in television, frequency modulated broadcasting, aerial navigation and radar. Their shielding walls are designed to protect against atmospheric electricity.

In the Navy hangar, fine mesh wire will be used as a shield. It will be one-eighth inch galvanized mesh wire, installed around the entire hangar in such a manner as to prevent any breaks in its continuity. Two layers of wire mesh will be laid in the concrete floor.

Wire mesh is used in this building, instead of solid sheets of galvanized steel or copper, because it is cheaper and will permit ventilation and light, while at the same time opposing passage of electronic disturbances.

In the Nutley building, the walls are made of prefabricated panels made up

of flat sheets of aluminum and fluted sheets of steel, with an inch-and-a-half layer of glass fiber between. The glass is an inert, dielectric material that prevents electrolytic action between the two metals and also acts as insulation to keep heat within the building.

The steel sub-floors of the buildings are also made of prefabricated panels with a cellular structure, over which a lightweight concrete fill is poured. The cells provide runways for electric cables to furnish power within the building where needed.

Science News Letter, August 24, 1946

BIOLOGY

System Similar to Radar Not New to Bats

See Front Cover

► BATS USE the thin, tough membrane that forms their wings not only to fly, but to catch food and locate obstacles.

Most species of bats, except the large fruiteaters, make a collecting net of the membrane, doubling it up like an apron. The bat then deftly removes the insects upon which it feeds with its strong teeth or flies to a nearby tree where it can manage the larger victims, states Richard Headstrom of Boston, Mass.

The picture on the front cover of this

SCIENCE NEWS LETTER, by George A. Smith, Quarryville, Pa., shows a brown bat with his wings not quite folded out of sight.

Bats, unjustly abhorred by many superstitious people, detect obstacles in their path by an echo system somewhat similar to that of radar. They emit supersonic notes that are reflected by the obstacle. The membrane which serves as wings is equipped with sensitive nerves that apparently respond to the reflected sound waves and help locate the source.

Bats, true mammals with the habits of birds, are not at all fitted for walking. Their hind legs are twisted around so that their knees bend backward, in the

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opposite direction from ours, Mr. Headstrom points out in a report to the Massachusetts Horticultural Society. This makes it extremely difficult for them to walk. When they do attempt it, they succeed only in a flapping shuffle.

The little brown bat often found in the northeastern United States mates in October, but the single young is not born until the following June or July. The mother nurses her young from the breasts as does a mouse for two or three weeks, after which the baby is expected to forage for himself.

The wings of the brown bat often measure nine inches from tip to tip, yet when folded they hardly show. When the bat rests or sleeps, it hangs head downward, holding on by the claws of its hind feet.

As cold weather approaches, bats move into caves or hollow trees, where they pass the winter. Some hibernate alone, but more often they collect in twos and threes, or even larger groups. While hibernating, they hang head down, with their wings folded close to their sides.

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plane were gathered by Navy air engineers at the Marine Corps Air Station, Cherry Point, N. C., as radio controls sent the planes through maneuvers while television or radio-telemetering instruments gave ground observers complete information on the engineering and structural performance of the craft.

The equipment developed by the Naval Air Experiment Station, Philadelphia, Bell Aircraft Corp., and Cornell Laboratories, Inc., is an advanced form of experimental "drone" flights first made more than five years ago.

The test pilot, with a notebook to record his plane's achievements in flight, couldn't compete with the automatically recorded data sent by instruments in the systems demonstrated.

Navy equipment demonstrated radio control maneuvers at high angles of dive and dangerous speeds. Telemetering and television kept the records of the flight. Cornell Aeronautical Laboratory demonstrated a telemetering system installed in an SB2C-5, while the Bell Aircraft Corp. showed a radio control system for flying a Grumman F7F.

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NUTRITION

Food Plans for World

Long-range planning of United Nations Food and Agriculture Organization aims at better-balanced diets for all countries of the world.

➤ MORE MILK, fruits and vegetables but less sugar are the high points in the United Nations Food and Agriculture Organization's goals for the United States food supply in 1950 compared with prewar American diets, the FAO's world food survey reveals.

Based on a predicted 12% increase in population by 1950, the goals for the United States headline a need for 55.6% more milk and milk products, excluding butter, than the nation used before the war. Fruit and vegetables should jump to 48.6% more than prewar consumption, the goals indicate, with 17.6% more meat, fish and eggs needed for the 12% increase in population.

Americans before the war used more sugar than the 1950 goal of the FAO, while most other products should show percentage gains of less than the population increase.

With Americans averaging more than 3,000 calories in their daily diet compared with the FAO minimum of 2,600, the goals outlined for the United States are aimed at a better balanced diet rather than more food. But Americans are not the biggest eaters in the world; New Zealand, with an average of 3,281 calories for each person per day top the list.

Lowest calories per individual were reported for troubled Korea with an average of only 1,904. The survey covered 70 countries with nine-tenths of the world's population.

The United Kingdom, like the United States, needs more fruits, vegetables and

milk with less sugar, according to the survey. The FAO also called for a 2.5% decrease in grain products consumption by the British to meet an expected 6% population increase by 1950, while the United States will need 4% more grain than was consumed before the war.

But balancing American and British diets is a small matter compared with the fact, emphasized in the FAO survey, that "about half the world's population was seriously undernourished in the years before the war."

The goal for China's millions by 1960 includes a jump from 20,000 tons of milk to 1,150,000 tons or an increase of 5,650%. India, by 1960, should show a 60% increase in milk and a 330% increase in meat, slightly more than the goal for China. Both countries require more of all food products, the survey shows.

South America will need more food of all classifications, while southeastern Europe requires increases for all foods but grain.

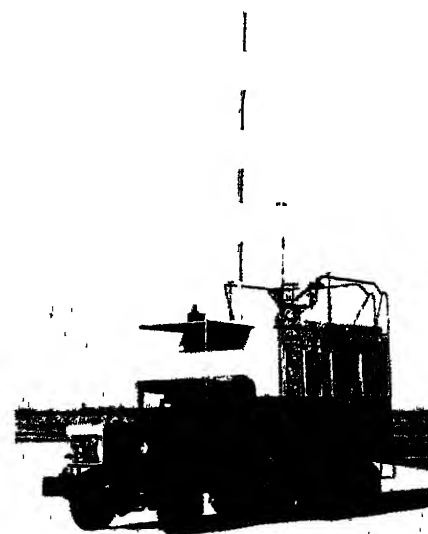
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AERONAUTICS

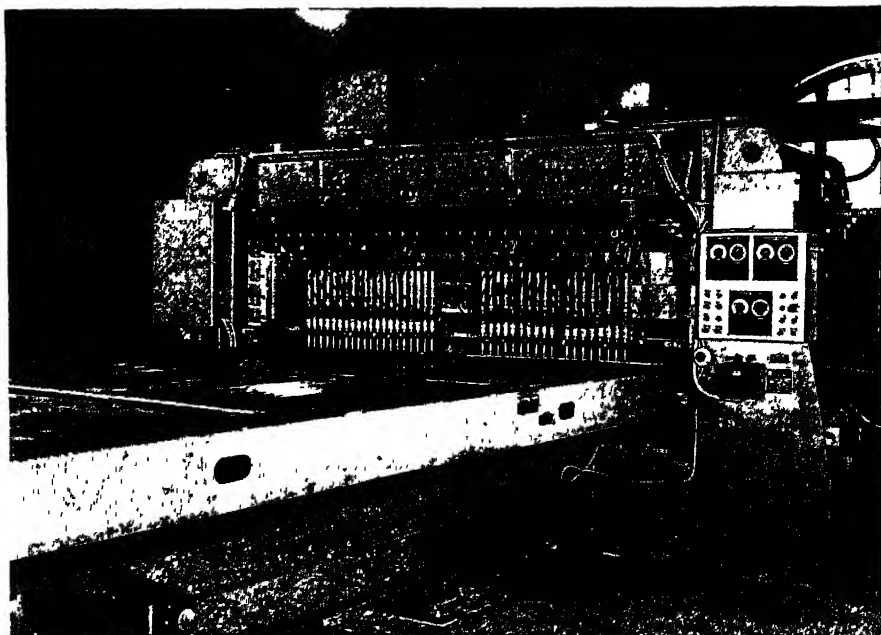
Television and Radio To Record Flight Tests

➤ TEST PILOTS, the daring heroes who test new aircraft at the risk of their lives, may lose their jobs in the future as scientific instruments put new aircraft through their paces without a pilot at the controls.

Complete data on the flight of a new



LIFE SAVER—U. S. Navy's structural flight test station, which controls by television and radio equipment take-offs, landings and other maneuvers during test flights. The truck is completely mobile, carrying its own power supply and all electronics gear used during operations. Note chair on top from which operations are controlled.



LARGEST SPOT WELDER—Battery of welding electrodes on this new multiple electric spot welder can make up to 48 welds at a single stroke. It is used in making streamlined railway passenger cars in the Chicago plant of the Pullman-Standard Car Manufacturing Co. Table under the electrodes moves forward carrying the metal sheets to the correct position for the electric strokes that "sew" bracers or stiffeners to them. A unique electric eye arrangement makes the operation automatic.

AGRICULTURE

Research in Agriculture

Scientific research by Federal agencies and in co-operation with states on a greatly expanded scale is aim of Agricultural Research Act.

➤ SCIENTIFIC research in agriculture will undergo an enormous expansion under the provisions of the new Agricultural Research Act recently signed by President Truman. The \$9,000,000 authorized in the bill is for beginnings only; expenditures are to be increased until at the end of five years they will total \$61,000,000 annually.

Of this sum, \$20,000,000 will be turned over annually to the state experiment stations, to be added to the present yearly grants under the Bankhead act of approximately \$7,000,000. Another \$15,000,000 a year is to be expended by the Department of Agriculture itself on research looking toward wider and more efficient uses of agricultural products. At present the four Regional Research Laboratories get \$1,000,000 each, and additional sums are spent on utilization research in other

places such as the Forest Products Laboratory at Madison, Wis.

Something new has been added to the type of research to be supported by the Department of Agriculture in a third category, in which an eventual annual outlay up to \$6,000,000 is authorized by the new bill. The Secretary of Agriculture, cooperating with the states, may contract with outside institutions or individuals for special research projects, following the pattern set during the war by the Office of Scientific Research and Development. Similar peacetime research programs involving the cooperation of non-governmental laboratories and scientists have already been undertaken by the Army and Navy.

Finally, \$20,000,000 a year is authorized for research in the broad field of marketing. Investigations may range all the way from a study of fungi that spoil

fruits and vegetables in transit or storage to compilation of statistics to aid economists in cutting down the price spread between producer and consumer.

The initial \$9,000,000 contemplated in the bill is only authorized, not appropriated. Before the work can ever begin, the next Congress will have to make some money actually available. In the meantime, however, research heads in the Department are making surveys and preparing preliminary budgetary estimates.

One of the biggest headaches for the planners is the question of finding the trained personnel to carry on the research. Even for the relatively modest program which the initial overall total of \$9,000,000 will support, it will be difficult to find researchers. The young men who should have been in college and graduate-school work during the past five years have been in the armed forces and have not received the training they should have for the efficient use of the money.

The corps of research workers who will be needed to make the full \$61,000,000 really useful to the country when it becomes available five years hence are now seniors in high school. They can hardly be ready for the money when it is ready for them if in the meantime they are compelled to lose time as draftees sweeping barracks or digging foxholes on summer maneuvers.

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ELECTRONICS

Phosphor in Lead Makes Infra-Red Rays Visible

➤ A TINY bit of lead added to zinc sulfide, a phosphor material that glows after exposure to light, makes invisible infra-red rays visible, a scientist of the General Electric laboratory has found. The discovery may eliminate electronic methods now used.

This easy way to change invisible rays into visible ones may be used to simplify the famous Army sniperscope and snoopscope used by soldiers during the war to see in the dark, themselves unseen. It may also simplify the receivers used on Navy vessels to read infra-red signals from other ships.

Dr. Gorton R. Fonda, responsible for the discovery, explained that waves of infra-red radiation are too long to affect the eye, while those of ultraviolet are too short. However, the ultraviolet is easily made visible by the phenomenon of

fluorescence used in the fluorescent lamp. In the lamp tube in which they are generated they fall upon the phosphor with which the tube is lined, their wave lengths are increased and they emerge as visible light.

Fluorescence by itself cannot make infra-red radiation waves shorter; it can only make them longer. However, there is an indirect way in which they can make visible light come from a phosphor.

Some phosphors, he explained, show

phosphorescence; they continue to glow for a time after the original radiation has been removed. If, while this glow remains, the phosphor is exposed to infra-red, the brightness may be slightly increased. After that it quickly fades out. Dr. Fonda found that the effect, previously known to other scientists, occurs with zinc sulfide, a common phosphor, provided it contains a fraction of a per cent of lead.

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national cupboard. If that is done, however, it is to be presumed that Gen. MacArthur will see to it that this time they observe international rules for whale conservation.

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TEXTILES

Jute Made into Wool Substitute in India

➤ SCIENTISTS in India, who have been searching for chemical processes of producing rayon, paper, and cheap woolen fabrics from jute, have developed a new material from jute fiber similar to coarse wool.

Prof. S. C. Sirkar and N. N. Saha, of the University of Calcutta, announce in the British scientific journal *Nature*, (June 22), that the new material, a hydrated cellulose, is superior to any previously developed.

During the war India's outlets for marketing its annual five-billion-pound jute crop, 98% of the world's supply, were so reduced that the India Central Jute Committee financed research to give jute new jobs to do at home.

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AERONAUTICS

New Regulations Mean Fewer Fires in Flight

➤ FIRES IN flight will be few indeed under new government regulations promised by the Civil Aeronautics Board. The orders, intended to eliminate practically all fire hazards in airplanes, will include requirements for additional fire-prevention apparatus, the use of non-combustible materials, and safeguards in electrical installations.

Easy access from the cabin to baggage and other compartments in the plane is regarded as essential by the CAB, so that a fire can be easily reached with fire extinguishers. Fire-detecting equipment in cargo and other compartments is another essential together with automatic extinguishers. Better extinguishers are desirable, particularly those using methyl bromide and carbon tetrachloride. These are better than carbon dioxide extinguishers, the CAB says.

The use of paper lunch and lavatory accessories constitutes a fire hazard, according to the Board. Aircraft designers will be required to place greater emphasis on the use of non-combustible materials in cabin lining, sound-proofing and waste containers.

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ZOOLOGY

Japan's Whaling Industry

The war with its sinking of Japan's whaling vessels wiped out whaling as an industry, and created a serious food shortage.

➤ JAPAN'S whaling industry, a highly important contributor to the island empire's food and commercial economies, was practically wiped out by the war. Figures from official Japanese sources show that the annual catch by Japanese whalers collapsed from a prewar figure of nearly 13,000 whales to only 531 in 1945.

Before the war, Japan had a fleet of six so-called factory ships, each capable of hauling a whole dead whale onto its deck and processing it for oil. Each of these factory ships was attended by a flotilla of small tug-like killer boats that did the actual hunting and harpooning. With this fleet, Japan stood about even with Germany but was considerably outclassed by the whaling fleets of Norway and Britain.

In addition to the factory ships, which sought whales mainly in Antarctic waters, Japan had on the home mainland several shore stations for rendering whale oil and processing whale meat, and one such station in the Bonin islands, in the Kuriles, and on the coast of Korea. Whale meat is unappetizing to Europeans and Americans, but the Japs seem to like it.

Japanese whalers in distant waters seldom brought their whale oil home. They sold it on the homeward voyage, used the proceeds to buy petroleum, loaded that into their tanks to take back and add to the war-lords' stockpile of military essentials.

After Pearl Harbor the factory ships of course could not visit the far southern whaling grounds any longer. This was a break for the whales, because Japan

was the one power that refused to ratify or abide by the international agreement of prewar days for whale conservation, which even the Nazis observed—at least when people were looking. The ships, apparently converted for use as tankers, were found and sunk by Allied submarines and airplanes. It is believed that none of the six is left afloat today. The same fate overtook many of the killer boats, which were used as patrol craft and for other auxiliary purposes. Japan's whaling fleet is as thoroughly gone as her naval fleet.

Results show up strikingly in recent whale-catch figures. During the five-year period 1936-41, the number of whales of all species killed in Antarctic waters by Japanese whalers was 32,017. Japanese ships also sought whales in the Arctic during the two years just before the war; total catch for 1940 and 1941 was 1,252. For the five prewar years, the catch in home waters totaled 11,052 whales; the number had climbed from 1,217 in 1936 to 2,349 in 1941.

Then came the war, and with it the end of all factory-ship operations. Only the shore-based whaling in home waters continued. Before Pearl Harbor this apparently began to dwindle, for the 1942 catch was 1,148. In 1943 it had risen again to 1,491, and in 1944 the figure had been boosted to 2,169 dead whales.

Then came 1945, bringing total defeat and ruin: the count of whales taken for what had been the Japanese Empire was a mere 531, all in home waters.

It may prove desirable to let the Japanese catch whales again in their home waters, if only to replenish their bare

PETROLEUM

Oil Hunters Will Wear Bullet-Proof Jackets

► U. S. OIL prospectors in the jungles of Colombia will wear Army bullet-proof jackets for protection from native arrows, the Quartermaster Corps has disclosed.

Doron-armored jackets, that can repel missiles up to and including a .45 calibre revolver bullet, will protect the oil hunters from the primitive arrows that have killed or wounded many employees of an American oil company in the past few months. The armored panels in the coats are made of glass-filament laminated plastic, and they are fitted with a special tail piece containing six plates of armor and suspended from the rear of the jacket.

The scene of the new search will be unexplored country, but similar prospecting in the region has resulted in casualties when parties were ambushed by natives, reported to be accurate marksmen.

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PHYSIOLOGY

"Gazelle Boy" Story Believed Only Myth

► JESSE OWENS, Gunder Haegg and the other great track stars that own world's running records need not fear for their marks because of a "gazelle boy" reported from Africa, in the opinion of scientists.

The story told in a London newspaper reported a "human gazelle," raised by the animals, eating grass and bounding around with the speed of his foster-parents, something like 50 miles per hour. Hunters have allegedly captured the boy and put him in an African asylum.

But Dr. Dale Stewart, anthropologist at the National Museum, Washington, D. C., warns that these stories of human-animals or animal-humans have "always been on hearsay evidence."

Man, for thousands of years, has been telling stories of humans raised by animals, and they are still being told in today's comic strips. One of the earliest and most famous was of Romulus and Remus, mythical first settlers of Rome, who were said to have been raised by a wolf.

Only five years ago, Kamala, "the wolf girl," was reported from India by a missionary who rescued her from the jungle with whom she had allegedly

lived for her first eight years. She died in an Indian orphanage after nine years with humans.

Russia has reported "human bears," and modern literature includes Kipling's Mowgli, but scientists are still skeptical.

"No one has ever brought in proof," declares Dr. Stewart.

Incidentally, if the "gazelle boy" does turn up in a track meet and actually can run at a speed of 50 miles per hour, he'll do the 100-yard dash in about four seconds and the mile run in one minute and twelve seconds!

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RADAR

Radar Stations Locate Bad Weather Over Ocean

► BAD WEATHER over the oceans, so high that it may never disturb surface conditions, will be located and tagged by radar when a series of storm-detecting stations are completely established by the Army. These disturbances are important in high-flying transoceanic flights.

The application of radar to storm detection is a war development, an unexpected discovery. Pilots of radar-equipped planes in the Pacific area noted effects on their scopes that were at first unexplainable. Later it was determined that they were due to reflections of radar pulses from storm formations ahead. The discovery was valuable. It gave the Army a means of dodging storms in the paths of planes en route to Japan with a cargo of bombs.

Six storm detection radar stations have already been established in the United States by the Army Air Transport Command's air weather service. A total of 35 are planned. These stations can detect thunderstorms within a 200-mile radius. They can follow the storm and observe its rate and direction of movement on the radar scope. This makes it possible to forecast with great accuracy when the storm will arrive at any given point. The program of the Army air service calls also for special investigation of stratosphere weather and for special weather studies in electronics.

Planes equipped for radar observations are now taking off daily from Florida, Newfoundland, the Azores and California to locate bad weather over the ocean. Weather information obtained is reported by radio, and used both by the Army and the U. S. Weather Bureau.

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ASTRONOMY

Comet du Toit-Neujmin Expected to Return

► ASTRONOMERS are resuming their search for comet du Toit-Neujmin, discovered in July, 1941, and due to return to the vicinity of the earth this summer. The comet was believed to have been rediscovered the end of July, but a study of the path taken by the bright object spotted moving across the sky indicates it is probably a minor planet.

Some weeks ago Director Virginio Manganiello of Argentina's National University Observatory at La Plata reported that on July 31 Senor Cecilio spotted a faint object moving across the constellation of Virgo, the virgin. But Dr. Enrique Gaviola, director of Mexico's Cordoba Observatory, has reported to Harvard Observatory that further observations suggest the tiny object is not the comet as first suspected.

Calculations of the path followed by the moving object show it will come within about 279,000,000 miles of the sun on Oct. 13. This brings it between the orbits of Mars and Jupiter. In this region revolve the asteroids, minor planets so tiny they can be distinguished from faint stars by their motion only.

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INVENTION

Higher Vacuums Made Possible for Research

► WHAT LOOKS like an important new aid to both physical research and industrial technology is offered by three English inventors, J. W. Tills, J. B. Lovatt and F. C. Potts for patent 2,404,997. It is an invention for getting nearer to nothing at all than has hitherto been possible.

With even the most efficient air-pumps it is extremely difficult to obtain a really high vacuum, and the less air there is left in a given space the harder it is to get any more out. The English trio propose to impress electric charges on these last few elusive molecules by means of a beam of X-rays, and then whisk them out of the way by means of an electrostatic field.

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TEXTILES

Ultraviolet Rays Detect Streaks in Textiles

➤ INVISIBLE ultraviolet radiation, which already has many applications in medicine, chemistry and the industries, now helps in a new field, detecting streaks and smears in printed textiles.

Use of ultraviolet for this purpose is among important findings made in the German textile industry by American postwar investigators. A special lamp is used which is called "Flu-Tex." It is an eight-inch quartz light tube, attached to the upper part of a reflector, and can be used in full daylight or in strong artificial light to examine materials. Fluorescent substances are added to the print paste to increase luminescence of certain print colors.

Other German processes in the textile industry were found by the scientists and textile technicians which may have value in the American industry. The Office of Technical Services of the U. S. Department of Commerce has issued a report for those interested.

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MEDICINE

Antibiotic, Litmocidin, Reported to Medicine

➤ DISCOVERY of a new antibiotic, or penicillin-like chemical, is announced to American scientists in a report by Dr. C. F. Gause of the Institute of Tropical Medicine, Moscow, in the *Journal of Bacteriology* (June).

The new substance has been named litmocidin because it is a pigment, and like the litmus paper familiar to every chemistry student, turns red in acid and blue in alkaline solutions.

It is produced by an organism found in the soil of southern Russia. The organism, an actinomycete, belongs to the same general group as those that produce streptomycin.

What future the new antibiotic will have is not clear from Dr. Gause's report. It is strongly active against staphylococci, streptococci, tuberculosis germs and cholera germs in the test tube, but has only moderate effect on dysentery germs and practically none on the germs of typhoid fever.

Tried on mice, litmocidin seemed pretty safe but did not work well as a remedy for blood poisoning caused by a strain of staphylococci which were checked by the antibiotic chemical in the test tube.

Details of the purification and chemical properties of litmocidin are given by Dr. M. G. Brazhnikova, also of the Institute of Tropical Medicine, Moscow. It has much in common, he reports, with the anthocyanin pigments of higher plants which are responsible for the colors of such vegetables as red beets and purple cabbage.

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AGRICULTURE

Tobacco Curing Is Being Streamlined

➤ SCIENCE IS about to streamline a traditional industry of the old South by introducing pushbutton methods for tobacco curing.

Until recently, bright leaf tobacco, the kind used in cigarettes, was cured just about as it was when great-granddad was in knee pants. Now growers are replacing wood-fire furnaces with automatic equipment which not only promises to improve the product, but will relieve farmers of back-breaking drudgery.

About 30,000 of the approximately 290,000 curing barns in Florida, Georgia, North and South Carolina and Virginia will be converted from wood furnaces to coal stokers and oil burners this season, according to engineers of Minneapolis-Honeywell Regulator Co., who are working with state agricultural experiment stations in introducing the new methods.

Since 1869, when the flue-curing process was originated, farmers have depended upon unreliable wood fires to heat their barns. It requires five days to cure a barn of tobacco and, since proper temperatures must be maintained 24 hours a day, growers were able to snatch only a few winks of sleep during the six weeks' harvest period.

Now, with automatically controlled stokers, it is possible for a grower to set his thermostat at a certain level and not have to check it again until time to change the temperature for another stage of curing. A thermometer installed so readings can be made outside relieves him having to enter the barn except to check moisture content and color of the leaf.

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METALLURGY

Boron Used Successfully In Hardening Steels

➤ VALUABLE new information on the use of boron partially to replace molybdenum in hardening steels results from a wartime study now available to the public.

The testing was carried out at the Battelle Memorial Institute, Columbus, Ohio, under the sponsorship of the National Defense Research Committee by M. C. Udy and P. C. Rosenthal. A report prepared by these two scientists is available from the Office of Technical Services, U. S. Department of Commerce.

One hundred boron-treated steels were tested. Nickel-chromium-molybdenum and manganese-molybdenum base steels were used. From the standpoint of hardenability best results were obtained with additions of .0015% to .002% boron, the researchers found. The boron addition had no apparent adverse effect on notch-bar toughness at temperatures down to 80 degrees below zero Fahrenheit.

Boron can be used to replace half the molybdenum in aluminum-killed steels of certain compositions, the report states.

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INVENTION

Ball and Socket Joint Compensates for Own Wear

➤ BALL AND socket joints important to users of many kinds of machines, will no longer need frequent replacement if a new joint recently patented lives up to expectations. It is called an automatic wear-compensating joint, the wear being compensated for by a tapering pin that spreads the two halves of the ball.

This ball of the joint is in two semi-spherical parts with curved inner surfaces that form a tapering bore to hold the tapering pin. The smaller end of the pin, projecting through the socket, holds a nut behind which is a spring. The spring tends to draw the pin tighter into the bore, and does so if there is any wear on the outside of the ball or the inside of the socket. This expands the sections of the ball, causing them to fit closely into the socket. A special system of lubrication helps reduce wear.

The patent number for this joint is 2,401,814 and it was awarded to Paul B. Burhans of Fort Myers, Florida.

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CHEMISTRY

Insecticide Repels and Kills

NMRI 448, most effective insect repellent and killer, developed by Navy research for jungle fighting, is being manufactured for civilian use.

➤ A TWO-EDGED weapon against "bugs" that does more than even DDT has emerged from scientific research.

It repels insects and it kills insects.

Like DDT, the new chemical, called 448, goes on killing any insects that come in contact with it for a long time. It is effective up to 30 hours, after it has been sprayed on walls, clothing and skin.

Going farther than DDT, this new anti-bug weapon also repels insects, keeping them at bay for 10 to 14 days.

If you spray your house or barn, you not only kill all the flies, mosquitoes and other bugs in it, but you can be sure no more will come in for 10 days to two weeks. It is non-poisonous, so it can be sprayed on cattle before they go out to

pasture, and on people going to picnics or sitting on the lawn.

NMRI 448 was developed by Lt. Comdr. Michael Pijoan and associates at the Naval Medical Research Institute, Bethesda, Md. The initials are for the name of the institute. It is made up of two long-named chemicals, 2-phenylcyclohexanol and 2-cyclohexyl cyclohexanol.

The repellent feature, of course, was the prime object of the research at the Naval Medical Institute. Even before the first Marine landed on Guadalcanal, the Navy knew it had to fight bugs, especially malaria mosquitoes, as well as Japs. And fighting bugs in the tropics, as many a returned veteran will tell you, is something different from swatting the flies or mosquitoes that occasionally get into your screened house or lifting a few ants out of the sugar at a picnic.

A repellent for use in jungles has to be powerful, safe and easy to use. Something a man can quickly douse himself with which won't hurt him if he should swallow a little of it and something that won't irritate his skin. It also has to be something that will not dissolve in water, so that it will not be washed off by sweat and tropic rains.

To make sure of this point, 448 and other repellents were tested under tropical conditions in the laboratory. A temperature of 90 degrees Fahrenheit dry bulb, 80 degrees wet bulb, was maintained in a cage full of mosquitoes.

Scientists and their assistants smeared a repellent on one of their arms and then sat with it inside the cage, holding a clock on the mosquitoes to time the first bite. To make sure the repellent would work under conditions of dripping sweat as well as "pool sweat," the kind that stays on the skin instead of dripping off, the scientists engaged in vigorous exercise for some of the tests.

Dimethyl phthallate, most commonly used insect repellent during the war, had a repelling time of only 80 to 90 minutes. NMRI 448 averaged 289 minutes in early laboratory trials. Follow-up trials in the jungle showed it had an even longer repelling time.

Mosquitoes that spread malaria were the chief target at which 448 was aimed. But it has turned out to be effective against disease-bearing mosquitoes as well as such other bugs as chiggers, fleas, flies and cockroaches.

Insect repellents have been known and used for many years. Some of you may remember burning Chinese punk sticks at evening garden parties. Oil of citronella, which some people found as repellent as the mosquitoes did, is another old-timer.

The two most effective repellents today are the Navy's 448 and Rutgers 612, which chemically is 2-ethylhexanediol 1,3 Indalone, introduced within the past few years, is highly effective against flies.

The insect-killing power of 448 has only recently been discovered, since it was made in the search for a better repellent. It is this unique double feature, killing and repelling, of 448 that promises to raise it above DDT and other newer insect killers.

The list of new insect killers is long and confusing. They include the highly toxic benzene hexachloride, also known as 666; sabadillo, azobenzene, a highly effective unidentified compound with the empirical formula $C_{10}H_6Cl_8$; DFDT which is a chemical cousin of DDT, TDE which is another relative of DDT, and hexaethyl tetraphosphate.

The war stimulated the search for new chemical weapons against bugs for a number of reasons. Troops had to be protected against malaria, typhus fever and other diseases spread by insects. More food was needed, so crops, poultry and cattle had to be protected as never before. Finally, some of the older anti-bug chemicals, such as rotenone, were in short supply.

Peace finds the world still desperately needing food, and people in many regions living under such overcrowded, unsanitary conditions that disease is an ever-present specter. Many public health officials believe that one-half the infectious, or germ-caused, disease problems occurring in the world are directly attributable to insect vectors. The financial cost of insect destruction is staggering. The poultry industry alone loses \$85,000,000 in a year to insects.

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Official U. S. Navy photograph

11-HOUR REPELLENT — Lieut. (jg) Jachowski (left) watches Lieut. Comdr. Michael Pijoan (MC), USNR, as he completes the synthesis of the new insecticide which repels disease-bearing insects for as long as 11 hours as well as kills them. Two years of laboratory experiments with some 2,000 trial preparations were made at the Naval Medical Research Institute, Bethesda, Md.

PHYSICS

New High for Protons

Frequency modulation principle applied to atom-smashing is expected to accelerate protons to 350 million electron volts. Fifteen million volts have been attained.

➤ PROTONS, the nuclear particles which scientists are grooming as the most powerful puncher in atom-smashing, have been accelerated to a new high energy of 15,000,000 electron volts at the University of California.

Significantly, this top power was achieved in a pilot experiment in Prof. Ernest O. Lawrence's 85-ton cyclotron, which a little more than 10 years ago was the world's only big-league atom-smasher but has now been dwarfed by a succession of giant machines.

Fifteen million electron volt protons were achieved using the new frequency modulation principle, which will be applied to the 4,000-ton cyclotron now nearing completion. Eventually this machine is expected to be able to accelerate protons to 350 million electron volts.

Technical difficulties have always made it more difficult to speed up protons to the high energies of less temperamental nuclear particles such as deuterons (heavy hydrogen nuclei) and

alpha particles (helium nuclei). For this and other reasons, deuterons and alpha particles have been most widely used.

Frequency modulation, suggested by Prof. Edwin M. McMillan, makes it possible to adjust the timing of accelerating electrical impulses to fit the characteristic revolutions of protons as they are pushed around the circular orbit in the cyclotron chamber. This was proved in the pilot experiments with the 85-ton cyclotron.

One of the reasons the proton is considered to be the most promising atomic bullet for learning about the nucleus of the atom is that the proton itself is a basic particle of the nucleus. Deuterons and alpha particles are made up of neutrons as well as protons.

The experiments in which the new proton energies were achieved were conducted by Drs. J. Reginald Richardson, Kenneth R. MacKenzie, E. J. Lofgren, Fred Schmidt, and Byron T. Wright, of the Berkeley Radiation Laboratory.

Science News Letter, August 24, 1946

been reported to be from 7 to 11 days per woman in comparison with 2 to 7 days per man.

Studies of illnesses lasting one day and longer made by the U. S. Public Health Service show that the excess sickness in women is not due to the so-called "female diseases" but is true of almost all the diseases common to men and women. The chief causes of sick-absenteeism were: 1. Respiratory diseases, such as colds and 'flu, which accounted for about 50% of both the number of cases and the annual number of days lost. 2. Digestive diseases, which were responsible for almost 20% of the cases.

Married women in industry, burdened with household and family worries, present plant physicians with somewhat higher sickness rates than single women. Industries that aid their workers in finding transportation, recreation, nursery schools, and housing will probably reduce the sick-absenteeism of women.

Pregnant women who work because of economic needs have brought to industry many new health, production, and social problems. Federal and health agencies suggest that women be allowed a minimum leave of six weeks at the end of pregnancy, and from six to eight weeks after delivery.

The new book is issued under the auspices of the National Research Council by W. B. Saunders Co.

Science News Letter, August 24, 1946

INDUSTRY

Third of Women to Work

➤ BY 1950 one in every three women over 14 years of age, or more than 16,000,000 women, will be employed in nearly every type of industry in the United States.

This mass invasion of the man's world will bring to industry problems concerning the health and efficiency of working women that were not solved during the employment peak of the war years when 18,000,000 women were in industry.

"Women appear to be more critical of the working conditions than men," says Dr. Anna M. Bactjer, of Johns Hopkins University, in her new book, "Women in Industry." Adequate lunch periods, rest pauses, and sanitary facilities reduce fatigue and add to the happiness and efficiency of women at work as do proper working hours and accident prevention rules.

Since women are on the average only 85% as heavy as men and have only

about 60% as much physical strength, they have often been excluded from jobs that proper training would have enabled them to perform. The War Manpower Commission and the American Medical Association committee on the health of women in industry aided employers to plan normal training periods for jobs for women during the war.

Women have been found to be more satisfactory than men in work that requires accuracy and speed with the hands. One automobile manufacturer reports that women are especially suited for bench work, assembly, inspection, conveyor loading, packing, paint spray, spot welding, light punch press, and riveting.

Women are ill more frequently and lose more time from work because of sickness than do men, but their absences are shorter. The average number of days lost per year due to sickness alone has

MEDICINE

Tobacco Not Believed To Cause Cancer

➤ IF YOU have been scared by a recent popular magazine article suggesting that "tobacco may be the cause of widespread, terrible forms of cancer," you can relax with your pipe or favorite brand of cigarette if you wish.

That is what one scientist consulted did. When asked the question: does smoking cause cancer? He pulled out his pack of cigarettes. Then he settled down to tell what was obvious, that in his opinion there was no danger.

Pursuing the matter further, authorities at the National Cancer Institute were consulted. They advised that there is no experimental or clinical evidence which would indicate that tobacco smoke is a factor in the cause of cancer. There is some clinical evidence, meaning from studies of men, not mice, that tobacco tar may be a cause of cancer, but it is not very conclusive.

Science News Letter, August 24, 1946

Do You Know?

Ice cream was first made and marketed in Baltimore, Md., in 1851.

Over half of all the *children* in the United States today were born in rural communities.

Weed-killer 2,4-D is the same substance which is used in weak solution to produce seedless tomatoes.

For *canning*, year-old hens and older stewing birds are better than very young chickens; they have more meatiness and flavor.

Though the rapidity of *wound healing* is apparently not affected by vitamin C, a moderate deficiency of this vitamin interferes with bone repair.

Viscose rayon fibers become warmer and more wear-resistant when fish protein is added to the cellulose compound, German scientists claim.

A new topographic *surveying* device called the "step-writer" which measures distances directly by the leg-motion of the pedestrian, has been developed for U. S. Army Engineers.

Radio communication between New York and Moscow can now go by way of an automatic relay station at Tangier, North Africa, when magnetic storms interfere with the direct air route about over Iceland.

A method has been developed to determine the amount of *carbon monoxide* in the air by the reaction of red mercuric oxide with this poisonous gas; the reaction forms carbon dioxide gas and mercury vapor.

THE SCIENTIST IN ACTION by W. H. GEORGE
A SCIENTIFIC STUDY OF HIS METHODS

This book is for those who need to do ORIGINAL thinking. CLEAR thinking. THINKING WITH A PURPOSE. Help you to DISCOVER ideas, tell you how to DEVELOP them! Explains clearly METHODS OF WORKING to get RESULTS.

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GENERAL SCIENCE

Science Failed Hitler

➤ GERMAN scientists were Hitler's hope. They were to produce the miracle weapons that would give the German forces superiority over the Allies in spite of their wealth, resources, ingenuity and ability to produce. Near-miracle weapons nearly came, but the coming was too long delayed.

Some of the reasons for the delay are given in a report just issued by the Office of Technical Services, U. S. Department of Commerce, as a result of postwar studies made in Germany by American civilian and military scientists and technical men. It was prepared by Col. Leslie E. Simon of the Army Ordnance Department.

Lack of contact and coordination between scientific groups working for the Army, Navy, Air Force and the industries, all with separate establishments, was an important reason. Jealousy between scientists and engineers was another, according to the report.

While one part of the report gives a comprehensive picture of the organization of German scientific establishments, considerable space is given to outstanding scientific accomplishments. Some of the unique contributions of German scientists are also included.

The report gives descriptions of major

developments in aerodynamics, rockets, fuzes, armor penetration, infra-red, computing machines, parachutes for bomb stabilization, and the use of sound as a weapon.

Among the unique developments is included a long-range combination instrument, called a phototheodolite, that could take pictures giving details 15 miles away, and a relatively small tube filled with phosphorescent chemicals which could be used to detect enemy infra-red waves.

Of particular interest, however, is a nearly perfected glide bomb which could be viewed on a television screen as it was guided by radio to its target, and a nearly completed beam-climbing missile capable of following a radar beam focussed on an enemy plane or ship.

These two, together with long-range rockets and jet-propelled implements of war, were probably the principal miracle weapons that Hitler expected his scientists to produce to save him when his Army and air force failed. They nearly did so, but their achievements came too late.

Science News Letter, August 24, 1946

ENGINEERING

Plastic Bearing Models Aid Study of Lubrication

➤ MODELS OF machine bearings made of transparent plastic are taking much of the guesswork out of lubrication problems. With these models scientists can watch the distribution of the oil or grease, and see how they perform.

The use of these plastic models was revealed by John Boyd, Westinghouse research engineer who developed the novel technic. One peek at them, he said, is better than weeks of mathematical calculations.

"Now we can see what is happening," he continued, "and can design bearings which will handle a heavier load and help make possible more powerful motors without any increase in size or weight."

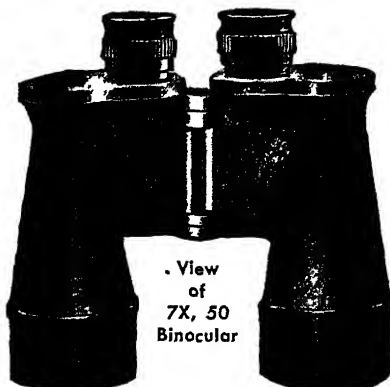
How well the flow of the lubricants in bearings approximated ideal conditions was a mystery until this test method was developed.



INSIDE LOOK—Transparent plastic model of an actual machine bearing shows the technic developed by a Westinghouse research engineer who needed to know what happened to lubricating oil inside a moving bearing. Oil, colored red, is fed into the plastic bearing and the lubrication effectiveness immediately is apparent.

WAR BARGAINS in LENSES and PRISMS

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| 6164-Q* | 26 | 104 | .80 |
| 6166-Q | 29 | 54 | 1.25 |
| 6168-Q | 29 | 76 | 1.25 |
| 6171-Q | 32 | 171 | 1.00 |
| 6173-Q* | 34 | 65 | 1.00 |
| 6176-Q* | 38 | 181 | 1.00 |
| 6177-Q* | 39 | 63 | 1.10 |
| 6178-Q* | 45 | 189 | 1.50 |
| 6179-Q* | 46 | 78 | 1.25 |
| 6182-Q | 27 | 51 | 1.25 |
| 6183-Q | 44 | 189 | 2.50 |

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| 3053-Q | Right Angle | 70 mms. | 168 mms. | 3.00 |
| 3001-Q | Lens Surface | 20 mms. | 14 mms. | 2.00 |
| 3006-Q | Porro-Abbe | 9 mms. | 9 mms. | .25 |
| 3009-Q | Porro | 52 mms. | 25 mms. | 1.00 |
| 3029-Q | Dove | 16 mms. | 65 mms. | 1.25 |
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MISCELLANEOUS ITEMS

| Stock No. | Item | Price |
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| 3006-Q | Porro Abbe Prism | \$0.25 each |
| 2024-Q | 10 Pieces Circular A-1 Plate Glass (Dia. 81 mm.—for making filter) | .25 |
| 3021-Q | Amici Roof Prism (3rd grade) | .25 each |
| 523-Q | Six Threaded Metal Reticle Cells | .25 |
| 624-Q | Neutral Ray Filter size 4 1/4" x 2 1/4" | .25 |
| 3022-Q | Round Wedge 65 mm. dia. | 5.00 each |
| 16-Q | Level Vial, 48 mm. long | .20 each |
| 1040-Q | 6 Power Magnifier—diam 25 mm. | .25 each |
| 2043-Q | Standard Crossline Reticle—diam. 29 mm. | .50 each |
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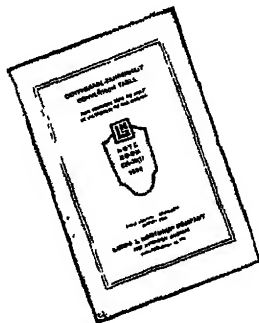
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to answer at once, "Why, hunters' guns, of course!"

That would not be the correct answer at all. Unlimited massacres that went under the name of hunts did account for a great deal of the havoc, but they were not the only factor, not even the principal one. The pioneer's ax, not the hunter's gun, must bear the main responsibility.

The passenger pigeon was a woodland bird. It needed trees for nesting and for the gregarious roosting of its huge flocks. Even more it needed acorns and beechnuts for food. Longfellow takes note of this peculiar food habit in "Evangeline," where he speaks of the portentous flocks of pigeons "Darkening the sky in their flight, with naught in their craws but an acorn."

The pioneer was an enemy of the forest; or rather, he considered the forest an enemy of himself. It held land that he wanted to plow; it sheltered redskinned enemies who wanted to scalp him. So he swung his ax at the trunks of trees as he might have at the necks of stubborn foemen.

And when the pioneer stage gave way to the developmental (which often meant merely the exploitative), the early lumberman finished the job of sweeping the Eastern forests clean.

All of which meant death for the passenger pigeon. The felling of the trees robbed him of both home and food, and the multiplication of the human population at the same time increased the number of hunters who had never heard of bag limits. There may have been other factors at work, too, that we do not know about now, like epidemic diseases. At any rate, the passenger pigeon went, and went fast.

Science News Letter, August 24, 1946

AERONAUTICS

First Flight of XB-36 Judged Excellent

► THE "X" now in the XB-36 designation of the Army's new giant bomber can be dropped soon, judging from the excellent performance in its first flight recently made. The "X" stands for "experimental."

It will stay until enough flights have been made so that all "bugs," if any, are located and corrected, and the plane is ready for production-line construction. The XP-84 Thunderbolt, the Army's newest jet-propelled fighter, has been in the air since early summer. The XS-1, designed for a trial to beat the speed

of sound, has undergone glider and diving tests in the air and is now being fitted with its rocket engines that will enable it to reach high altitudes in an atmosphere far too rare for the operation of other engines.

The XB-36, the big brother of the famous B-29, had undergone nearly two months of ground and taxi tests before it was given its first tryout in the air. Army officials pronounce the first test satisfactory. The plane remained aloft for 38 minutes, then settled safely to the runway in a performance that exceeded expectations.

The world's largest bomber is roughly 40% larger than the B-29. It is 163 feet long, has a wing-span of 230 feet, and a rudder height of over 37 feet. It is powered by six 3,000 horsepower Pratt and Whitney engines mounted on the trailing edge of the wing, three on each side of the fuselage. Each engine drives a three-bladed pusher-type propeller.

The XB-36 was built by Consolidated-Vultee Aircraft Company at Fort Worth, Texas. Design and construction were under the supervision of the Army Air Forces Materiel Command, Wright Field, Ohio. It carries a crew of 15 men, has an estimated range of 10,000 miles, and a bomb-carrying capacity of more than 30 tons.

Science News Letter, August 24, 1946

MEDICINE

Paderewski Hospital Moves Back to Poland

► A GREAT Polish medical center, the Paderewski Hospital, which has been an institutional guest in the city of Edinburgh, Scotland, during the past five years, is now preparing to go home and do its share in the reconstruction of Poland. Its director, Dr. Antoni Jurasz, is in Washington, D. C., with a colleague, Dr. W. Koskowski, to report on a survey of the medical situation in their home country which they have just completed, and to discuss plans for the transfer of the hospital.

The Paderewski Hospital, which comprises a medical school and a research institution as well as a hospital and out-clinics, was established by the Paderewski Testamental Fund, an agency of American Relief for Poland.

The hospital, during the war, provided medical care for thousands of Polish citizens in exile, including some overflow patients from Polish military establishments in Britain.

It is expected that (See next page)

Books of the Week

THE CHALLENGE OF POLIO The Crusade Against Infantile Paralysis—Roland Berg—*Dial Press*, 208 p., \$2.50. An account of the tireless search for a magic drug to halt infantile paralysis.

DAWN OVER ZERO. The Story of the Atomic Bomb—William L. Laurence—*Alfred A. Knopf*, 274 p., illus. \$3. An eye-witness account of the first test of the bomb in New Mexico with an analysis of the potentialities and limitations of the use of atomic energy in civilian life.

A DESCRIPTIVE AND ILLUSTRATIVE CATALOGUE OF CHINESE BRONZES—*Freer Gallery of Art*, 108 p., plates, \$5. An analysis of the Chinese figures used in ceremonial vessels, blades, and mirrors with their historical data accompanied with illustrations.

DIAGNOSTIC EXAMINATION OF THE EYE—Conrad Berens, M.D., and Joshua Zuckerman, M.D.—*Lippincott*, 711 p., \$15. A step-by-step procedure for a complete examination of the eye, written for the practitioner, the ophthalmologist, and the medical student.

EDUCATION IN PERU—Cameron D. Ebaugh—*U. S. Printing Office*, 91 p., tables, paper, 20 cents. A survey of the educational progress in Peru giving a description of the elementary, vocational and professional training offered in the schools. Federal Security Agency, Bull. 1946 No. 3.

ETHNOGRAPHY AND ACCULTURATION OF THE FORT NELSON SLAVE—John J. Honigmann, and NOTES ON THE INDIANS OF THE GREAT SLAVE LAKE AREA—J. Alden Mason—*Yale Univ. Press*, 212 p., tables, paper, \$2.50. Yale Publications in Anthropology, No. 33 and 34.

GREEN FIELDS ARE GOLD—*DuBois Press*, 42 p., paper, 11 cents. A book presenting facts on how to increase farm profits through a Grassland Program: the production, preservation, utilization of grass for pasture, hay, silage, all fodder, forage and roughage crops.

HIGH-SCHOOL PERSONNEL WORK TODAY—Jane Warters—*McGraw-Hill*, 277 p., \$2.50. A book for high-school administrators, teachers, and specialists who are concerned with student personnel work.

THE LIFE OF A CHEMIST—Memoirs of Vladimir N. Ipatieff—*Stanford Univ. Press*, 858 p., \$6. The autobiography of a contemporary chemist, which gives the layman an understanding of the problems facing the scientist in war and in peace.

THE METALLURGY OF QUALITY STEELS—Charles M. Parker—*Reinhold*, 248 p., tables and illus., \$6. An introduction to the fundamentals of the metallurgical sciences.

NEW WORLDS IN MEDICINE: An Anthology—Harold Ward, ed.—*McBride*, 707 p., tables, \$5. The story of modern medicine in peace and at war. Conspicuous in the dramatic panorama are such grim problems as cancer, old age, epidemics, and venereal disease, while, like an undertone of artillery, come the stories of medicine in World War II.

NUCLEONICS: What Everybody Should Know About Physics—*Public Affairs Press*, 38 p., tables and illus., paper, \$1. A handbook on

the structure of matter and the atom, including a discussion of its peacetime applications.

A REEXAMINATION OF THE FOSSIL HUMAN SKELETAL REMAINS FROM MELBOURNE, FLORIDA With Further Data on the Vero Skull—T. D. Stewart—*Smithsonian Institution*, 28 p., plates, paper, 30 cents. Smithsonian Miscellaneous Collections, Vol. 106, No. 10.

SUCCESSFUL TEACHING Its Psychological Principles—James I. Mursell—*McGraw-Hill*, 338 p., \$3. A comprehensive account of teaching organized about six basic psychological principles: context, focus, socialization, sequence, and evaluation.

TECHNIQUE OF PSYCHOANALYTIC THERAPY—Sandor Lorand, M.D.—*International Univ. Press*, 251 p., \$3.50. The basic principles of psychoanalytic therapy as set forth by Freud and applied to the author's clinical experiences.

UNITED NATIONS WEEKLY BULLETIN—*International Documents Service*—weekly, \$6 a year. Vol. 1, No. 1, of a new bulletin published by the Department of Public Information in order to provide a concise account of the activities of the United Nations and its specialized agencies.

USE OF TOOLS. Phototold in 420 Pictures—Fremont Davis and Marjorie Van de Water—*Infantry Journal Press*, 238 p., illus. and diagrs., \$3.50. Illustrations with some lines of text by the photographer and a staff writer of Science Service, showing how to use tools, how to keep them in good repair, and even how to repair them.

Science News Letter, August 24, 1946

WILDLIFE

Sulfa Drug Treatment For Hatchery Disease

► **YOUNG TROUT**, salmon and related fish can be saved from the most destructive of hatchery diseases, furunculosis, by sulfa drugs, Dr. James S. Gutsell of the U. S. Fish and Wildlife station at Leetown, W. Va., reports in *Science*, (July 26).

Most successful of the sulfa drugs he used in his experiments was sulfamerazine, although sulfathiazole also produced good results.

Furunculosis is, in plain English, boils. Job had furunculosis. He didn't die of it, however, and fingerling trout do. The sulfa drug treatment is the first real sign of hope in the history of artificial fish rearing.

Science News Letter, August 24, 1946

From Page 126

the Paderewski Hospital will be set up in the Katowice industrial region in Silesia, which is to Poland what the Pittsburgh area is to the United States.

Dr. Jurasz stated that he has met with full understanding on the part of the Ministry of Health in Warsaw, and that negotiations for the homecoming of his hospital are progressing satisfactorily.

Science News Letter, August 24, 1946

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New Machines And Gadgets

✿ **AIRCRAFT** radio receiver is so compact that it can be mounted in a standard three-inch instrument opening in the plane's instrument panel. Cylindrical in shape and about six inches long, it is designed for use in private aircraft. By a flip of a switch it can be changed instantly from radio range to traffic control frequencies.

Science News Letter, August 24, 1946

✿ **CLOTHESLINE** tightener consists of an S-shaped aluminum hook and a cadmium plated steel clevis, or link, that operates over the notched end of the hook. The free end of the line runs through the clevis. When the line is pulled tight, then released, the clevis grips it.

Science News Letter, August 24, 1946

✿ **COMBINATION** try square and handsaw uses the back of the saw blade for a straightedge and an attachable slotted metal piece to form the heavy leg of the square. This slotted piece straddles the saw blade close to the handle and is held in place by a set screw and an arm projecting rearward.

Science News Letter, August 24, 1946

✿ **TANGLE-PROOF** lifeline keeps Junior out of trouble, makes life easier for mother. Lightweight nylon cord is wound around an automatic take-up reel which can be anchored in the ground or attached to furniture. The strong cord can be adjusted to any desired length.

Science News Letter, August 24, 1946



✿ **SKY CRADLE** provides a seat and bed for baby airline passenger. Suspended by webbing on a tubular metal frame, the bassinet has a quilted plastic lining and wide belt fastened by a zipper across the child. Special waterproof lining for exclusive use is provided.

Science News Letter, August 24, 1946

✿ **STAR CHART** and star measuring tape enable amateur astronomers to locate the 55 navigational stars. A rotating arm on the chart gives the direction and distance of a star sought; then the tape, held at arm's length with one end fixed on the North Star, makes easy the location of the star in the heavens.

Science News Letter, August 24, 1946

✿ **NEW-TYPE** coating for concrete, masonry and metal structures can be effectively applied on damp surfaces. The black protective film is waterproof, fire-retardant, will not flow or sag at temperatures up to 600 degrees Fahrenheit, and does not wrinkle in sunlight.

Science News Letter, August 24, 1946

✿ **HOME DUST** precipitator, which removes also pollen and smoke from air, cuts cleaning costs and relieves hayfever suffering. The motor, that charges the particles of dust and collects them on negatively charged cell plates, is contained in a metal radio-size cabinet.

Science News Letter, August 24, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 925. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

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Question Box

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Why may test pilots soon lose their jobs? p. 117.

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CHEMISTRY

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ELECTRONICS

What metal added to zinc sulfide makes infra-red rays visible? p. 118.

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NUTRITION

What are the high points in the FAO's world food plans? p. 117.

ORDNANCE

In what way are German V-2 rockets proving useful to American science? p. 115.

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What was the chief enemy of the passenger pigeon, causing its extinction? p. 126.

PHYSIOLOGY

Why do scientists believe the "Gazelle boy" story is only a myth? p. 120.

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Why is the proton the most promising atomic unit for learning about the nucleus of the atom? p. 123.

ZOOLOGY

What Japanese industry wiped out by the war has created a serious food shortage? p. 119.

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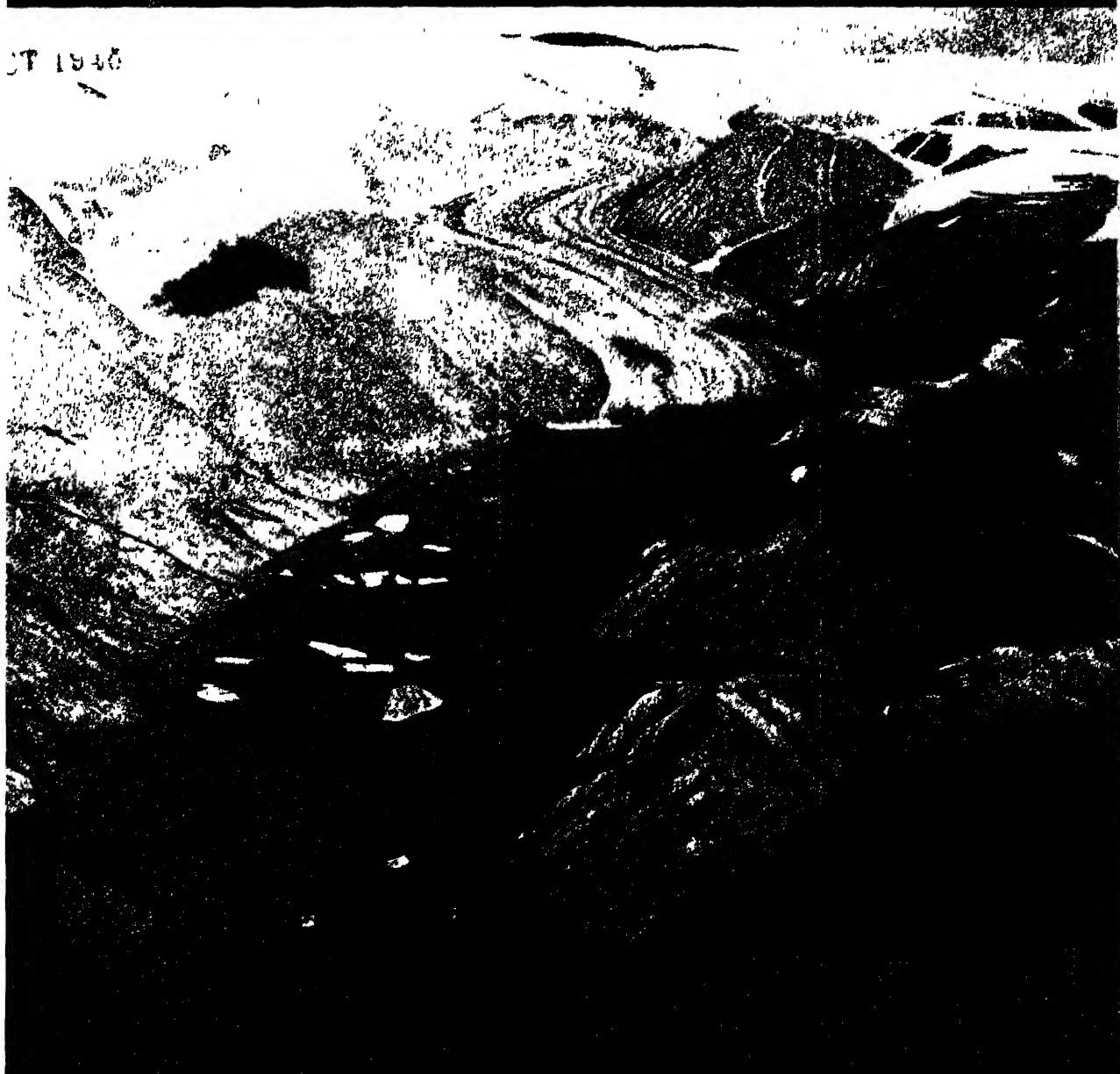
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EDUCATION

Teen-Agers View Navy

U. S. Navy, in cooperation with Science Clubs of America, will play host to 110 young scientists, providing them a first look into Navy science.

➤ TO SEE science at work in the Navy, a group of 110 teen-age boys picked as "Navy science cruisers" will spend five days at the end of September flying in Navy planes, going to sea aboard a big aircraft carrier and cruising in a battleships up the Atlantic coast.

The first postwar chance for young civilians to see Navy science in action is an activity of the Navy's Office of Naval Research working in cooperation with Science Service's Science Clubs of America.

Each Navy science cruiser will be identified with a specially designed brassard and will be required to keep a careful log of his observations to be turned over to the Navy at the end of the cruise.

The 110 boys named as Navy science cruisers were chosen through Science Clubs of America, the several boards of education and participating newspapers from the areas of New York City, Philadelphia, Pittsburgh, Providence, R. I., and Washington, D. C. Each boy was picked for ability in science shown by school records and achievement in events such as a science fair, science congress or the Annual Science Talent Search this year.

As guests of the U. S. Navy, the boys will fly from their home cities to Washington, D. C., and go on to Annapolis for a visit to the U. S. Naval Academy. There they will board the U.S.S. Randolph for a cruise at sea. From this aircraft carrier an air show will be staged for them. Putting into Norfolk, Va., the party will

board the U.S.S. Washington and the U.S.S. North Carolina and get acquainted with battleships as they cruise to New York City. A trip to Floyd Bennett field will complete their Navy science cruise and they will be returned to their home cities by Naval Air Transport.

Vice Admiral Harold G. Bowen, Chief of the Office of Naval Research, commenting on the Navy science cruiser program said, "As a result of the war and the lessons learned, it becomes essential that our new generation stress more than ever their education in science.

"This is necessary for several reasons. First, our country badly needs a new crop of research scientists to enable us to hold our own in the acquisition of new knowledge; second, an education in science is essential for our children to take their proper places in the new technological world; third, an education in science is essential in order that our young men will form a large reserve for future national defense which will depend to a much greater extent than heretofore on science."

Science Clubs of America, the organization for young scientists, with headquarters in Washington, D. C., has more than 250,000 boys and girls as members. It provides a year-round program for the more than 10,000 clubs affiliated and sponsors the Annual Science Talent Search for the Westinghouse Science Scholarships.

Science News Letter, August 31, 1946

GENERAL SCIENCE

Scientists To Be Deferred

➤ SCIENTISTS and technical workers and teachers in research laboratories, industry and colleges will not be drafted into the armed forces in coming months as the result of a reversal of selective service policy.

This allays great concern among industrial, research and educational authorities over threatened drastic cancellation of deferments for scientific workers who have been deferred throughout the war to do essential war research.

Selective Service has issued to local

boards a revised Memorandum 115 concerning such deferments. This about-face resulted from a request to Selective Service from Director John Steelman of the Office of War Mobilization and Reconversion, following a White House conference on July 23, when the disastrous effect of indiscriminate drafting of scientists, engineers and college teachers was made clear.

Information assembled by Dr. M. H. Trytten, director of the National Research Council's Office of Scientific Per-

sonnel, showed that the proposed cancelling of deferments of scientific workers would have removed 12% to 20% of the professional scientific personnel of industrial laboratories in many cases. Universities would have lost 40% to 50% of their technically trained teachers and research workers.

The new policy allows deferment for those engaged in college teaching, advanced studies and university, industrial or foundation research in the physical sciences and engineering, supervisory, technical or scientific personnel "whose removal would significantly retard production in industries essential to reconversion and otherwise necessary to the national existence," and qualified and irreplaceable production workers in industries designated as critical by the Civilian Production Administration. Production workers included are those in veterans' housing, public health, food and famine relief, etc.

The Office of Scientific Research and Development will certify graduate students and research workers for deferment, the Office of Education will certify teachers, and the Civilian Production Administration will certify production workers.

Science News Letter, August 31, 1946

MEDICINE

Fever Blister Virus May Cause Brain Disease

➤ THE VIRUS that causes fever blisters and cold sores may also cause the serious brain inflammation, encephalitis. The cold sore virus was isolated from the brains of two men who died of encephalitis, Maj. Loring Whitman, Miss Margaret J. Wall and Capt. Joel Warren, of the Army Medical Center, report in the *Journal of the American Medical Association* (Aug. 24). No mention of cold sores or fever blisters appeared in their medical histories, however.

When an epidemic of encephalitis, popularly known as sleeping sickness, swept around the world after the first World War, some scientists thought the cold sore virus was the cause of the disease, because it was isolated from spinal fluid or brain of patients. Other scientists did not agree.

Recent evidence besides that reported by the Army medical team now shows that the virus of cold sores and fever blisters, known medically as herpes, can cause encephalitis.

Science News Letter, August 31, 1946

AGRICULTURE

Blight Threatens Crops

Tomato blight is attacking crops in nationwide epidemic, causing great damage. New chemicals are proving successful controls.

➤ IF THERE is a shortage in canned tomatoes and tomato juice this winter, it can be blamed on one of the most severe epidemics of the tomato blight disease that has ever struck the country. Already this fungus plague has caused serious loss to the tomato crop in Maryland, Delaware, New Jersey and Pennsylvania, states Dr. J. E. Heuberger, professor of plant diseases at the University of Delaware.

Fast becoming a headache in the headachy business of food production, this vicious fungus, which runs in cycles and is now at the crest of a cycle, has already struck many of the most important growing areas. The infection has moved up the Atlantic seaboard, from Florida into Georgia, then into the Carolinas and Virginia, thence over Maryland, Delaware, New Jersey and Pennsylvania.

All possible means of control, including airplanes, are being used, but there is no adequate control equipment in

many areas since growers never before needed it.

Dr. Heuberger explains that until recently the growers' only weapon against the blight has been copper. This year, however, several new organic fungicides are being used to combat the disease. Various dithiocarbamates have proved effective. Two of these are disodium ethylene bis dithiocarbamate and zinc ethylene bis dithiocarbamate.

These chemicals have also been used against the blight where it has struck potatoes. Growers around Homestead, Fla., are said to have average yields of 100 bushels per acre higher under the new treatment than during previous years when only the old copper treatment was used.

Several experiment stations have reported that the dithiocarbamates are compatible with DDT, and make an excellent dual-purpose treatment for the control of insects and fungus disease on potatoes.

Science News Letter, August 31, 1946



"EXAM" BIRD—This rare skeleton was created by osteologists of Ward's Natural Science Establishment of Rochester, N. Y., for a college professor to use in testing students in comparative anatomy. The bird was fabricated from the hind legs of a cat; the backbone, wings, breastbone (without wishbone) and neck of a chicken; and the skull of a gar pike (a fish).

AERONAUTICS

Supersonic Plane Drive On

Race to build aircraft to beat the speed of sound is on in earnest. British and American rocket-powered models are ready for demonstration.

➤ THE RACE to beat the speed of sound with airplanes is on in earnest. British air officials announce that British engineers have plans for aircraft that will fly faster than sound, that models will be built and air-tested, and that later a full-size supersonic plane will be built.

These models will be rocket-powered and pilotless. They will be taken aloft and launched from ordinary aircraft, the London Transatlantic Daily Mail states. They will be guided by radio control, and will automatically "tell" the parent plane how they are behaving by means of radio-telemetering.

Radio-telemetering is an electronic system that measures stresses and strains

and reports the results constantly to a ground station or perhaps to an accompanying plane. An American type installed in U. S. Navy planes demonstrated recently how well a plane without a pilot can be guided in the air and its performances recorded.

America's entry in the supersonic speed race is the Army-Bell Aircraft XS-1, built according to principles learned by scientists of the National Advisory Committee for Aeronautics in its laboratories and supersonic and other wind tunnels.

The XS-1 has already been thoroughly tested without power in glider and diving performances, and will soon be given try-outs in gradually increasing

speeds when its rocket engines are installed. The supersonic test will be made later. Under present plans, it will not be pilotless. The same man who has handled it in the tests already made is expected to guide it in the break-through of the supersonic wall.

Other English developments in aviation parallel those in America, with perhaps more stress placed on gas-turbine and jet-propulsion than is emphasized in this country. The English have a 30,000-pound "flying wing" powered with turbo-jets that may be in the air later this year. They have a tailless airliner powered by four jet engines that will be put into commercial service over the Atlantic by 1950, it is expected.

An English jet-propelled Gloster Meteor climbed recently to an altitude of 46,500 feet, and reached an unofficial speed of 630 miles an hour, it is reported. Its official speed is 606 miles an hour.

Britain's new jet helicopter gave its first public demonstration recently, it is announced. Laterally directed jets directed sideways against the tail provide directional and torque control. The fan blades give it lift and forward motion as in American helicopters.

An English air official has just given

information relative to a new aerodynamic research station to be erected at Thurleigh at a cost of many millions of dollars, that will have the most modern equipment including supersonic wind tunnels. This is designed to help England keep to the front in aviation.

Science News Letter, August 31, 1946

PHYSIOLOGY

Easiest Way Is Best

Advice to housewives for efficiency in housework: maintain good posture, have shelves and work surfaces conveniently placed, and relax.

► THE EASIEST way to carry a heavy basket, climb stairs and sit in a chair is often the best way. Housewives, like efficiency engineers and factory workers, can study their motions in performing daily tasks so as to improve their methods, save energy and develop a good body carriage.

The feet should be apart when standing for your work so as to give a broad base and easy shift of weight. This will permit a wide range of movement, remind Dr. Helen Denniston and Margaret P. McCordic of the University of Wisconsin's College of Agriculture. Point the toes ahead to prevent strain on ankle and instep. Pull the abdomen up and hips down to hold the pelvis steady as a base for the spine. Lift the breastbone to allow heart and lungs plenty of room.

Supplies arranged in a circular manner around you are easier to reach. When they are beyond your reach, save time and energy by taking one long step instead of several shuffling ones.

Good posture going up stairs saves energy as well as being graceful. The body slants forward from the rear ankle. The entire forward foot is placed flat on the next step, and the body lifted by the large hip and leg muscles.

Keep the same erect posture when coming downstairs. While the toes, pointing straight forward, reach for the next step, the weight is received on the ball of the foot with an easy "giving" bend in the knee and ankle, Dr. Denniston and Miss McCordic point out.

When baskets or other objects to be carried have handles, the weight can rest against the hip. The weight, balanced by bending toward the other side, is then transferred directly to the large

bones and muscles of the legs.

All work surfaces should be a little below elbow level. Large blocks with a cavity in which the legs fit is good in elevating a table or bed to a suitable height for the worker. When the kitchen sink is too high for young helpers, have a broad platform handy for them to stand on while working.

Time and energy when ironing large pieces such as curtains or towels can be saved by fitting a wide board firmly over the ironing board. Because of the greater range of movement, it is more effective to stand than sit when ironing.

The position of the body when sitting down and getting up is fully as important as your posture while seated. With one foot back, the body weight can be shifted over the seat of the chair and lowered onto it by bending the knees. The trunk remains erect and arms relax into the lap. Reverse the movement when rising.

It is better to sit instead of stand when preparing vegetables or fruit. A low table or lap board, just above the lap, is excellent for this type of work.

When sweeping, place the hands far apart with one hand near the top of the broom handle. Bending from the hips and swinging the whole body from widely spaced feet makes sweeping a good exercise. By changing the position of your hands and direction in which you are sweeping, both sides of the body benefit.

There are three good positions for low work. A squatting position with one knee down and back straight is good when using a short-handled dust pan. The deepknee bend is fine for collecting many small objects spilled on the floor. When picking up a pencil or thread,

bend from the hips and keep the knees straight.

A chair should be lifted and carried with its back against the body, as most of the weight is at the back of the chair. Carrying a partially-filled pail or basket in each hand is easier than handling one full pail.

Learn to relax, Dr. Denniston and Miss McCordic advise in a pamphlet on how to make work easier around the house. Lie down on your back at full length on a bed or couch. A small rolled blanket placed under partly bent knees or your lower back may make you more comfortable.

Science News Letter, August 31, 1946

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AERONAUTICS

Low-Drag Promotes Speed

► **LOW-DRAG** wings for airplanes, known technically as laminar flow wings, were made practical during the war by the National Advisory Committee for Aeronautics, it is now revealed. Applied to both fighters and bombers, this aerodynamic principle contributed greatly to the superiority of American aircraft.

The low-drag airfoil principle, one of America's top secrets during the war, was disclosed by Dr. J. C. Hunsaker, chairman of the NACA. Employment of the low-drag principle enables a plane to fly faster and farther, he said, by virtue of its low drag. By a coincidence, he added, the pressure distribution which promotes smooth air flow also permits a higher flight speed before the onset of compressibility shock.

Laminar flow, as applied in aerodynamics, is a type of streamlined flow of the air over and under the airfoils or wings with a constant or steady motion of the air particles near the body of the wings, and with a minimum of eddying or turbulence. The term is used in contrast with turbulent flow, which is an unsteady air movement, with the air velocity varying at any given point in magnitude and direction.

In disclosing the principles of laminar flow as applied to aircraft, Dr. Hunsaker gave full credit to European scientists who applied them to correct form for ships, and to later men who, in the early days of airplanes and with no knowledge of hydromechanics, discovered that, in a plane, an arched wing profile was advantageous.

An English scientist named Lanchester, he said, showed how a wing would cause the air to rise to meet it and then descend. He found that a vortex would trail behind each wing tip. Later, theoretical work in England and elsewhere led to a conclusion that a smooth surface and a falling pressure gradient are necessary to maintain an extensive laminar flow. Theory then seemed to have reached its limits. The practical development of the laminar flow wing was carried out at the NACA's Langley Memorial Laboratory in Virginia.

A low-turbulence pressure wind tunnel at this station, completed in 1938, made this possible. By May, 1941, the technique of airfoil design and testing at Langley had advanced to a point where low drag could be obtained. The

theory served a useful part; it showed how to obtain a favorable pressure drop over the forward portion of the airfoil, and the sharp pressure recovery over the rear portion needed to prevent boundary-layer interruption and flow separation.

To obtain stable laminar flow, complete control of pressure gradients was found necessary. Work at Langley Field resulted in the discovery that the airfoil, designed to give desired pressure distribution, could be obtained with precision by an angular distortion of the curve into which the airfoil was transformed, and then correction of both the airfoil and the corresponding pressure distribution by successive approximations. The method was systematized in 1944, and reduced to engineering practice in 1945.

Science News Letter, August 31, 1946

CHEMISTRY

Refrigerant, Freon, Also Puts Out Gasoline Fires

► **THE FREON** chemical compounds that are used in household refrigerators and in air-cooling systems now have a new job. They are found to be more effective in extinguishing gasoline fires than the long-used carbon dioxide and other inert gases.

Freon is well-known to soldiers. It is the carrier for DDT, compressed into the aerosol bomb, which when released made an effective spray to kill mosquitoes and other insect pests. The Freons are harmless to men, being non-toxic, non-combustible, non-explosive and non-irritant.

The use of Freons to extinguish gasoline fires is recommended by the U. S. Bureau of Mines because of their effectiveness determined by a study of six inert gases and their effects on three different types of gasoline. The study was made by Bureau scientists and others from the Mine Safety Appliances Company.

Among the six gases tested, Freon 11 was found to be the most effective flame-quenching agent. Freon 12, Freon 21, carbon dioxide, automobile-exhaust gas, and nitrogen were next best in the order named.

Gasoline is one of the chief causes of costly fires and explosions because it is used by industry, the Bureau states, in

a greater quantity and a wider range of applications than any other combustible liquid. Gasoline fires in or about mines are not uncommon.

The Freons are a series of compounds containing the same elements but in different proportions. They are made by introducing fluorine into chlorine derivatives of methane gas. Their chemical names indicate that they contain both chlorine and fluorine.

Freon 11 is trichloromonofluoromethane, a long word but easily understood when divided into syllables: tri-chloro-mono-fluoro-methane. Freon 12 is dichlorodifluoromethane, and Freon 21 is dichloromonofluoromethane. Freon 21 is probably the one most commonly used in refrigerating and air-cooling systems. Freon 11, the best flame-quenching agent among the six inert gases tested, is used in centrifugal compressors feasible only for large refrigerating or air-cooling units.

Science News Letter, August 31, 1946

GENERAL SCIENCE

Associated Universities, Inc. New Research Center

► **WORLD'S** largest cyclotron and synchrotron and a uranium pile for producing radioactive elements for laboratory work are planned for the new Associated Universities, Inc., that is going to turn the former Army camp at Camp Upton, N. Y., into an atomic research center. Dr. Philip M. Morse, professor of Physics at Massachusetts Institute of Technology and newly-appointed director of research for the institution has disclosed.

A cyclotron of 500,000,000 volts and a synchrotron of comparable size are among the items of equipment scheduled to be constructed, Dr. Morse reported.

Ten to twelve buildings will house biological, chemical, physical, medical and engineering research groups on the 3,700-acre tract. About 1,000 persons will comprise the community, including both technical and non-technical personnel.

Associated Universities, Inc., is sponsored by nine universities: Columbia, Cornell, Harvard, Johns Hopkins, Massachusetts Institute of Technology, Pennsylvania, Princeton, Rochester and Yale. Edward Reynolds of Harvard is president of the new university, and the project's scientists will not be limited to the cooperating schools.

Dr. Morse emphasized that pure research looking to peacetime applications of atomic energy will be the primary purpose of the project.

Science News Letter, August 31, 1946

PSYCHOLOGY

Trained Intellectuals Needed

Many capable men take orders instead of giving them because of lack of education. A solution: make higher education available to greater numbers.

➤ A REALLY bright truck-driver may be a more capable man than the executive who sits in the office and gives him orders.

About one boilermaker in every eleven is as able-minded as the average lawyer.

These sample findings from the Army General Classification Test, given to 10,000,000 young men during the war, are offered by Dr. Walter V. Bingham, chief psychologist of the Adjutant General's Office, to point a moral in a discussion of the general abilities of American adults. He presents his views in *Science* (Aug 16).

His inference is that if you are inclined to be complacent about a truck-driver being better than his boss, or a boilermaker just as good as a lawyer, you are looking at things wrong-end-to. Rather,

you should be asking why the truck-driver isn't giving orders instead of taking them, or why the boilermaker isn't making briefs instead of boilers.

Of the group who scored highest in the Army General Classification Test, all of them capable of absorbing a college education, only one-fourth were college graduates, Dr. Bingham points out. In a world where there is an actual famine of trained intellectuals and skills, he considers this tragic.

As one partial remedy, he calls for a greatly increased number of scholarships available to really superior applicants for higher education. He also thinks that all universities and colleges should have staffs of specialists to pick out and encourage the most promising students.

Science News Letter, August 31, 1946

ARCHAEOLOGY

Fire-Worshippers Found

➤ CENTRAL hearth believed to be the oldest remains of fire-worship in Central Asia, perhaps in the whole of the East, has been excavated in the USSR near the Aral Sea.

Fire-worshippers continuously kept alive the flame in this hearth while meals were cooked in a series of surrounding fireplaces. Primitive hunters used these fires sometime between 4,000 and 3,000 B. C., states Prof. Sergei P. Tolstov, director of the Institute of Ethnography, Moscow, and member of the Soviet expedition that unearthed the dwelling with its many fireplaces buried deep beneath the sand dunes at the foot of the Janbas Kala hills.

Janbas Kala No. 4, as the place is officially called, was a large communal dwelling with clearly defined limits. It was shaped like a polygon, and covered about 347 square yards.

The community house was built on the ground. The walls consisted of a wooden framework of posts with cross-beams for the reed-thatched roof. The post-holes, all that remain, contained black ashy earth with fragments of charcoal, and were arranged roughly in three concentric circles.

No clay was used in the building. The rafters were placed radially on top of the posts, and the spaces between them filled with open wickerwork. The plan of the fallen roof could be seen in the ashy layer above the fragments of broken earthen pots, fish bones and flint flakes. Charred reeds, the remains of the roof, were found all over the area where the house had been.

In the middle of the building was a large round hearth, about four feet in diameter. This differed greatly from the cooking hearths, rows of which were found round the perimeter of the building.

A number of features marked this central hearth as different from the others. Household objects and kitchen refuse, found in large quantities round the other fireplaces, were completely absent from the central hearth or its vicinity. The ash there also was entirely different in character. Whereas that on the cooking-hearths was black and gray, with cinders, only pure white ash, indicating complete combustion of the fuel, was found in the central hearth.

A thick layer of sand under the hearth was burnt bright red. Similar layers of

sand only a fifth to four-fifths of an inch thick were found under all the cooking-hearths, but here the layer was around 20 inches thick.

The central hearth was undoubtedly of some religious significance rather than being used as a cooking-hearth, Prof. Tolstov states. Fire had evidently been burning there continuously for a long time.

Full details concerning the findings of the Soviet expedition in this important and little-known region are given in *Antiquity*, British Quarterly Review of Archaeology.

Science News Letter, August 31, 1946

GENERAL SCIENCE

Navy Invades Arctic With Planes, Ships

See Front Cover

➤ BASED AT Thule, Greenland, where Navy and Coast Guard vessels have penetrated the farthest north into the icefields that ships have ever sailed at this time of year, two Navy patrol planes have flown ice and weather reconnaissance missions over the Arctic within 450 nautical miles of the North Pole.

The picture on the front cover of this *SCIENCE NEWS LETTER* reveals an unusually long and "trailing" glacier from its mouth. It was taken from a Navy PBM as it flew west up Frederick Hyde Fjord, Peary Land, on the return leg of a 1400-mile hop.

The flights were a part of scientific studies being made of such varied subjects as cosmic rays and icebergs by the personnel on the ships at the Greenland port.

Only special equipment on the flights that reached the northernmost known land in the world was an electric compass that functioned well in the near-polar regions.

The expedition was "blackened out" by sunspots which cut off radio contacts the last week in July, but the difficulty aided the studies of scientific observers concerned with cosmic rays and radio communications problems.

In reaching the north Greenland port, the ships of the expedition sailed through iceberg-infested waters, using radar to keep clear of the North's most dangerous navigational hazards. It was reported that the southern limit of the ice pack lies farther north than usual, and this summer was described as unusually good for navigation.

Science News Letter, August 31, 1946

RADIO

Radio Blackouts Predicted

Huge sunspots are expected to cause occasional radio blackouts during the next year or two. National Bureau of Standards will forecast these.

➤ **BLACKOUT** of shortwave broadcasts during the next year or two can frequently be blamed on sunspots huge enough to be visible through smoked glass. This means they will be 50 to 100 times as large as the earth.

Only two or three years ago there were few spots visible on the sun and these were too tiny to be seen without a telescope. The number of pockmarks on the sun has been increasing since then and may reach a maximum late in 1947 or early in 1948. Prolonged, moderate disturbances are frequent during sunspot minimum. Briefer, more erratic storms tend to occur during sunspot maximum. They usually take place a day or two after a large spot passes the sun's meridian.

During the next few years radio forecasts will be more and more influenced by the number and size of sunspots. When no spots are visible during sunspot minimum, on the other hand, the tendency of storms to recur at 27-day intervals is more important in making forecasts.

Shortwave broadcasts may even be disturbed by fading and fluttering. Fading is due to signals coming in out of phase. The signals tend to interfere with each other. Fluttering is caused by scattered transmission. The beam does not follow the great-circle path closely enough.

When an ionosphere storm is in progress, lower frequency must be used as higher ones escape through the ionized layers. On the other hand, more and more of the lower frequencies are absorbed and fail to reach the receiving station. When the frequency band is so reduced at both ends that nothing gets through, radio broadcasts are completely blacked out.

Twice a week the National Bureau of Standards predicts how good reception of shortwave broadcasts from Europe will be. This is based on the number and position of sunspots, condition of the radio reflecting layers, magnetic storms and other data. Twice each hour it issues up-to-the-minute warnings. These are based not only on conditions on the sun and in the ionosphere, but upon how well

shortwave broadcasts here on earth are getting through.

These forecasts are being developed to the point that those listening to a worldwide hook-up will no longer be bothered by having a broadcast from Europe ruined by sputters or by fading out.

In making these long-range and up-to-the-minute forecasts, the National Bureau of Standards uses data supplied by laboratories at Stanford University, Louisiana State University, University of Puerto Rico, Harvard University, the Massachusetts Institute of Technology, and others. In addition, help is received from the Department of Terrestrial Magnetism of the Carnegie Institution of Washington, which is now maintaining observatories in Peru and Australia, and also assembles magnetic data.

The large and increasing amateur-radio fraternity known as "radio hams"

reports on actual transmission conditions. This, fitted in with reports from commercial companies, the Army and Navy, and the laboratories of the National Bureau of Standards, is used in making forecasts. The amateurs in turn use the forecasts to determine at what distances they can operate to best advantage, and whether broadcasts will get through.

Science News Letter, August 31, 1946

AGRICULTURE

Bad News About The Pepper Shortage

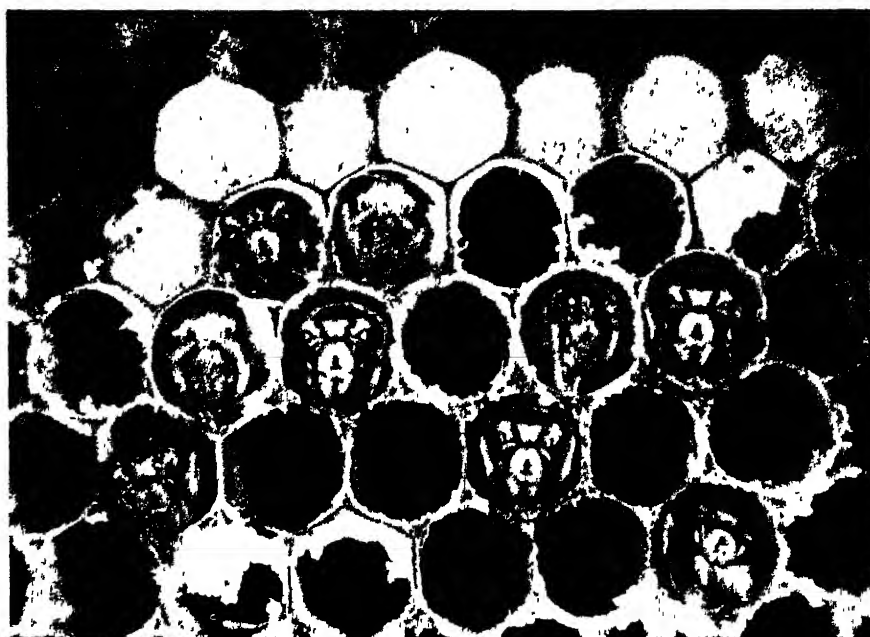
➤ **SOME FACTS** on the pepper shortage—and bad news for housewives:

Netherlands sources estimate that it will require three to four years to rehabilitate pepper culture on Bangka Island and Southern Borneo, large pre-war sources of the spice.

Only one-half of one percent, or 100,000 of 20,000,000 pepper trees on Bangka are now standing, while 20% of those in Southern Borneo remain after the war's devastation.

Spice culture in the Moluccas, which were used completely for food production by the Japanese, cannot be restored to prewar levels in less than eight years.

Science News Letter, August 31, 1946



GEOMETRY—Bees are by no means the only insect geometricians. The paper wasps build combs with the same meticulous arrangement of hexagonal cylinders, except they use papier-mache instead of wax. In these snug cells they rear their young with great care. Here the camera of Lynwood M. Chase has caught a group of new-fledged adults, ready to emerge and go to work. Above them the capped cells contain larvae which are not quite as far along in their development.

METALLURGY

Silver-Magnesium Solder Withstands High Heat

► SILVER-MAGNESIUM solder that can withstand the temperatures within gas jet turbines was found in Germany by American investigators. It is a material that should have wide value in the United States.

In addition to its use in turbines, the solder can be used in the fabrication of stainless steel heat exchangers, exhaust manifolds, gas turbine parts and general chemical equipment where high heat is encountered.

The solder is made of 85% commercially pure silver and 15% magnesium. Addition of magnesium to pure silver in this proportion gives an alloy with excellent soldering properties, it is said, and does not lower the melting point of the silver. The solder has a melting point of 1790 degrees Fahrenheit, and retains its high strength up to 850 degrees Fahrenheit.

A report on the silver-magnesium solder with additional facts relative to it has been issued by the Office of Technical Services, U. S. Department of Commerce.

Science News Letter, August 31, 1946

GENERAL SCIENCE

Lightning Kills Science Talent Search Winner

► LIGHTNING, not war, was responsible for the first death among the 200 winners of the annual Science Talent Search, all highly selected boys and girls with proved talent for research.

John Taylor Hopkins IV, 18, of Washington, D. C., a 1946 winner in the fifth annual Science Talent Search, was fishing in Jacksonville, Fla., when lightning struck his steel rod and all efforts to revive him failed.

Of the 200 chosen in the first five Science Talent Searches, 146 have been boys. Of these 73 have been or are now in the armed services. Another 52 are still under draft age. Many of the 73 served on the fiercest fighting fronts in the European and Pacific theaters, and others hazarded their lives at sea and on land in service operations. Two are holders of the Purple Heart for disabling battle injuries.

But it was lightning, unconquered phenomenon of nature, that turned a gay fishing excursion into a death trip for John Hopkins. He graduated this

spring as valedictorian, attended George Washington University and planned to enter Johns Hopkins University this fall on a four-year full tuition scholarship to study organic chemistry.

Outstanding work with diazo dyes earned Hopkins the honor of being chosen one of the 40 winners from 16,000 contestants in the Science Talent Search, sponsored annually by Science Service, and brought him a Westinghouse Science Scholarship.

Science News Letter, August 31, 1946

AGRICULTURE

Australian Beetle Aids In War on Weeds

► INSECTS that devour plants are not always man's enemies. One Australian beetle promises to become a useful ally to man in California because it eats only a certain kind of weed, known as the Klamath weed.

Success with imported stocks of the weed-eating beetle is reported by James K. Holloway, U. S. Department of Agriculture entomologist, who works in collaboration with the University of California experiment station. The beetle's usefulness, he explains, is due to the fact that the weed it feeds on, known elsewhere as St. John's wort, has no near relatives among crop or pasture plants.

About 100,000 acres of California lands are infested with the Klamath weed, and the helpful little beetles from Australia are being propagated as rapidly as possible so that they may be released in the fields.

Science News Letter, August 31, 1946

PHYSICS

Bikini Radioactivity Traced in California

► A FAINT radioactive echo of the Bikini blast was recorded on a sensitive electroscope at the University of California at Los Angeles on July 4, four days after the explosion. This has just been announced by Dr. Clifford Garner, who spent three years at the Los Alamos laboratory during the war.

This record at Los Angeles checks with an earlier report from San Francisco, where Geiger counters clicked slightly faster on July 4.

Air-borne radioactivity so far from the scene of the explosion was, of course, not at all dangerous.

Science News Letter, August 31, 1946



CHEMISTRY

Buttermilk Gave Clue to New Fire Extinguisher

► MAGNESIUM fires, easily started and hard to stop, can be put out with a new powder that owes its discovery to a glass of buttermilk.

The fire extinguisher looks like a large salt-shaker. The powder, to be shaken on the fire, is composed of eight parts talc, two parts casein powder and one part magnesium carbonate, added to keep it from absorbing moisture.

Dogged by the problem of keeping magnesium fires to a minimum, as he lunched one day, a safety engineer at Northrop Aircraft, Inc., remembered he had heard that buttermilk would put out fires. So instead of drinking his buttermilk, he experimented and found that it did retard the fire's progress. Chemists traced the fire extinguishing power of the buttermilk to casein, and mixed the talc and magnesium carbonate with it to facilitate pouring.

Science News Letter, August 31, 1946

PSYCHIATRY

More Psychiatrists Needed To Combat Mental Illness

► WARNING that 8,000,000 Americans are suffering from some form of mental or nervous illness, the U. S. Public Health Service at the opening meeting of the National Advisory Mental Health Council in Washington, D. C., appealed for more trained personnel, more research and demonstration projects and improved community mental health programs.

The Public Health Service estimated that 10,000,000 Americans in the current population will require hospitalization for mental illness sometime during their lives. At least four times the present number of psychiatrists are needed, with more funds for research and more community all-purpose mental clinics, the agency said.

The two-day meeting was the first for the council, set up under the National Mental Health Act. Other provisions of the act call for a National Institute of Mental Health and grants-in-aid for research and training.

Science News Letter, August 31, 1946

E FIELDS

HERPETOLOGY

Unhatched Turtles Show "Grown-Up" Reactions

➤ UNHATCHED young loggerhead turtles, taken out of their shells two weeks or more before normal time for emergence, show many of the same reactions that grown-up turtles have—swimming and crawling movements, snapping, righting themselves when overturned, and the persistent tendency to crawl seaward common to aquatic turtles.

These are among the results of a study of embryo turtle behavior made on the Florida coast by Dr. Karl U. Smith of the University of Wisconsin and Dr. Robert S. Daniel of the University of Missouri. They report on their work in *Science* (Aug. 16).

The two scientists took 55 eggs of loggerhead turtles and opened them at various intervals during their incubation period of from 45 to 50 days.

First movement of the embryo turtle was observed on the twelfth day. The animals, at this stage still shell-less and lizard-like in shape, merely bend their bodies when touched. They become able to move their legs independently about the eighteenth day, and give eyelid and mouth reactions at 22 days.

Science News Letter, August 31, 1946

CHEMISTRY

New Process Extracts Peanut Proteins

➤ TWO NEW forms of protein, good for making synthetic fabrics, adhesives and other manufactured products, can be extracted from peanut meal left after oil extraction by a newly patented process developed at the U. S. Department of Agriculture's Southern Regional Research Laboratory in New Orleans. Previous methods of extraction have brought out all the proteins at once, and they have had to be separated into fractions good for different purposes—which of course involved additional chemical treatment and consequently greater cost.

In the new process, the meal is first treated with water containing caustic soda, with its hydrogen ion potential adjusted close to the neutral point.

This brings about a total extraction of proteins. The remaining solids are centrifuged out.

Acid is added to the remaining clear liquid until the hydrogen ion potential is 6. At this point a white, semi-plastic precipitate is formed that can be pulled into filaments, ribbons or sheets showing a marked sheen or gloss. It has been named "protein 6." To the remaining clear liquid more acid is added until the hydrogen ion potential is 4.5. This brings out a second white solid, which is granular and non-sticky. This has been designated "protein 4.5."

The four-man team conducting this research, consisting of G. W. Irving, Jr., A. L. Merrifield, R. S. Burnett and E. D. Parker, has assigned rights in the patent, No. 2,405,830, royalty-free to the government.

Science News Letter, August 31, 1946

PUBLIC HEALTH

Soil Disposes of Penicillin Waste

➤ PENICILLIN, conqueror of many diseases, indirectly imposes a public-health problem on the communities where it is produced, which bacteriologists at Rutgers University have been working to solve.

The problem comes from the large quantities of left-over nutrient solution on which the penicillin-producing mold has been raised. It contains a mixture of sugars, plus amyl acetate and other solvent chemicals. Poured raw into the rivers, it would constitute an exceedingly nasty kind of stream pollution, which would provoke no end of protests, and probably restrictive legislation as well.

The soil, from which penicillin originally came, has provided the answer. Dr. Willem Rudolfs and his co-workers made a mixed culture of microbes from a teaspoonful of soil, subcultures from which are able to use up the last bits of nutrient material in the waste fluid and return clean water to the streams.

Two different processes have proved successful. One can be carried on without air, in big steel tanks like ordinary oil storage tanks. The other requires air, which is bubbled through the solution in long rectangular concrete tanks.

The outflow liquid from either type of tank is seeped through sand beds, where other billions of bacteria continue to work on it, until nothing is left but water, ready to go back into circulation.

Science News Letter, August 31, 1946

ELECTRONICS

Cesium Metal Vapor Makes "Talking Lamp"

➤ CESIUM METAL vapor allows an electric lamp to talk. Such a lamp developed by Westinghouse is used to emit invisible infra-red rays over which conversation can be transmitted from an instrument known as a photophone.

Infra-red communication systems were used by both Germans and Japs during the war for distances up to ten miles where wires could not easily be stretched and radio would be a giveaway. According to reports, however, they did not use cesium, sometimes spelled caesium.

The advantage of cesium, a metal of the sodium, potassium, lithium, rubidium group together known as the alkali metals, is that it is an efficient generator of infra-red waves, also a poor visible illuminant. Its low visibility minimizes requirements for a filter to block out stray visible light which would betray the presence of the signal system.

The cesium vapor lamp was designed by Dr. Norman C. Beese, Westinghouse research engineer, at the request of the U. S. Navy, but the device was not ready for use when the war closed.

Science News Letter, August 31, 1946

MEDICINE

Dual Treatment Advised For Dementia Paralytica

➤ ADVANCED cases of syphilis accompanied by psychotic symptoms can now best be treated by giving the patients penicillin as well as infecting them with malaria fever, three Johns Hopkins Hospital physicians, Drs. Frank W. Reynolds, Charles F. Mohr, and Joseph Earle Moore, advise in a report to the *Journal of the American Medical Association* (Aug. 17).

During two years 41 patients with dementia paralytica were treated with penicillin, 24 with the drug alone and 17 with penicillin administered at the same time as induced tertian malaria. There was 58% improvement for those dually treated as compared with 46% for the others.

The doctors conclude:

"The effectiveness of current penicillin-malaria therapy is such as to make it, for the present at least, the treatment of choice for patients with dementia paralytica."

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ASTRONOMY

Vega Shines Brightest

Planets are not well placed, but Mars, Jupiter and Venus are visible. Sept. 23 is the centenary of the first observation of Neptune and begins autumn.

By JAMES STOKLEY

➤ **ALTHOUGH** the planet Venus reaches its greatest distance east of the sun on Sept. 8, it will not then occupy the position high in the western sky that it normally does under such circumstances. However, it can easily be seen low in the southwest at dusk, with magnitude of minus four, much more brilliant than any other star or planet. The poor position of Venus comes from the fact that it is far south. Thus, its great distance from the sun merely takes it along the horizon, and not up into the sky.

Because it sets so soon after the sun, Venus does not appear on the accompanying maps, which indicate the sky's appearance for 10:00 p. m., standard time on Sept. 1, and an hour earlier in the middle of the month.

Brightest star shown on these maps is Vega, in Lyra, the lyre, which is high in the west, almost overhead. Directly overhead is the figure of Cygnus, the swan, with first magnitude Deneb. Altair, in Aquila, the eagle, is a little to the south.

In addition there are three other stars shown which are of the first magnitude but all are down near the horizon, where the atmosphere through which their light has to travel on the way to us causes a diminution in their brilliance. Low in the southeast is Piscis Austrinus, the southern fish, with Fomalhaut. To the northwest is Arcturus, in Bootes, the bear-driver. Capella, in Auriga, the charioteer, is in the northeast, reappearing after several months' absence from our night time skies. During the winter it will come into greater prominence.

Mars and Jupiter Visible

Mars and Jupiter also are in the sky in September, and in the figure of Virgo, the same as Venus. However, they are even closer to the sun than Venus. For that reason and because they are fainter they are still harder to see. On Sept. 3 Venus passes Jupiter, so that they will help locate it. Mars passes Jupiter on the 24th. Jupiter is of magnitude minus 1.3 which

exceeds any of the stars but Mars is fainter, even, than any of the six stars mentioned above, with magnitude plus 1.8.

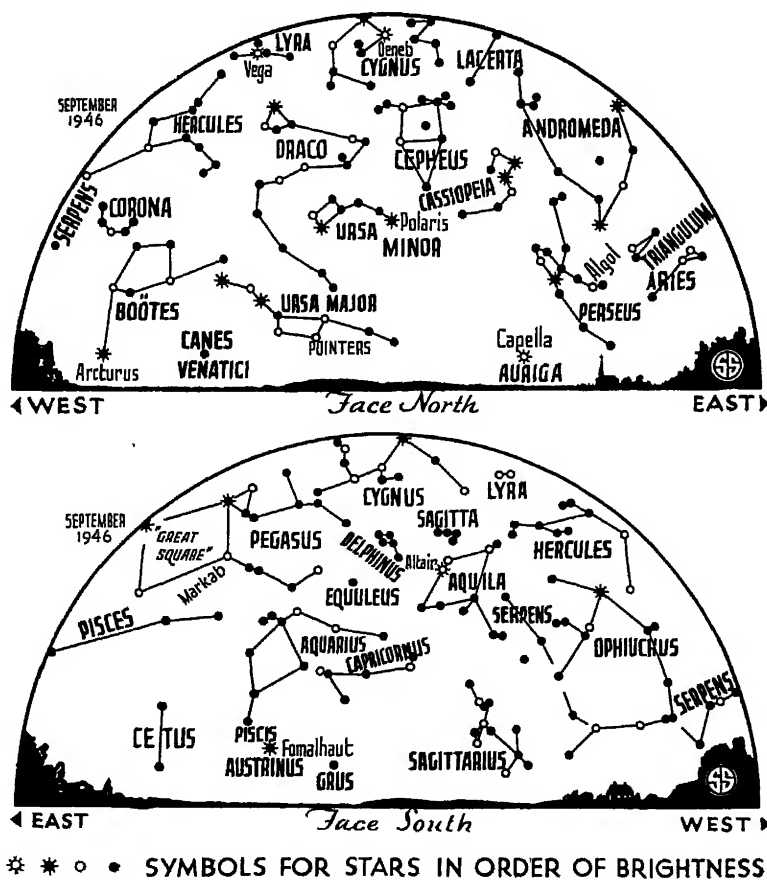
Though nothing happens in the sky on that date, Sept. 23 is important in the history of astronomy, especially this year, since it is the centenary of one of the greatest discoveries in science—and one that involved quite dramatic circumstances. It was on Sept. 23, 1846, that the planet Neptune was first observed, after its presence and position had been predicted by unprecedented mathematical techniques.

The theory of gravitation, which was published by Isaac Newton in 1687, had shown that this force acts throughout the universe and that each of the planets exerts an attraction on all the others. Thus, in calculating the orbits of the

planets, the movements of the others had to be considered, but this was done with great success.

In 1781, using a small telescope which he had made himself, William Herschel, in England, discovered the planet Uranus. This was actually the first planet to be "discovered," since all the others are visible to the naked eye and had been known from antiquity. After Uranus had been observed for several years astronomers calculated its orbit and found that it revolves around the sun once in 84 years, at an average distance of 1,800,000,000 miles.

However, early in the nineteenth century, it was found that there were some discrepancies in its motion. Even allowing for the attraction of the other known planets it did not go quite where it was expected to travel. This kept getting worse and worse, until by 1845 it was about two minutes of arc out of place. This is only about a fifteenth of the moon's apparent diameter, but an amount that is astronomically intolerable.



It was about this time that two astronomers, a 26-year-old Englishman named John Couch Adams, and a Frenchman, Urbain Jean Joseph Leverrier (aged 34 years), independently came to the conclusion that this was caused by a still more distant, and undiscovered, planet, of which the gravitational pull had not been considered.

Unprecedented Problem

Knowing where a planet was, astronomers had worked out the technique of ascertaining its perturbations on other planets, but the idea now was to do the reverse and, from the perturbations, to figure out the place of the planet that caused it. This was an exceedingly difficult and unprecedented problem, but in September, 1845, Adams finished some preliminary results and sent them to Prof. Challis, at Cambridge. A month later he had his final results, which gave the supposed position of the unknown planet, and sent these to Sir George Airy, the Astronomer Royal, at Greenwich.

Ignorant of this work, Leverrier in November, 1845, gave a preliminary paper in which he showed that the effects of the then known planets were not sufficient to explain the curious movement of Uranus. On June 1, 1846, he followed this with a second paper, giving for the disturbing planet a position that was within a degree—about two moon diameters—of the place where Adams had placed it.

On Sept. 3 Adams sent Airy a third paper, giving revised results, but still nothing was done about it. At first, apparently, the English astronomers had not a very high opinion of Adams' work. Also, there was the difficulty of locating the faint and moving planet among a horde of fixed stars. This was before the modern days of photography, when two plates, exposed on succeeding nights, would quickly reveal the wandering object.

A few weeks before this Leverrier, likewise, had issued a third paper, but this did not reach England until the end of September. When it did, and the English astronomers noticed the similarity to Adams' figures, they evidently had more respect for them and began to make observations with a view to locating the wanderer. But it was too late. A copy of the Leverrier paper reached J. G. Galle, at the University of Berlin, on Sept. 23.

Fortunately, he happened to have a new star map covering the region of Aquarius, where the planet was supposed

to be, and showing the permanent residents of that constellation. This would make it easy to find the stranger. The night was clear, he turned his telescope towards Aquarius, and there it was!

Discoverers Share Honors

Naturally, there was great controversy between England and France as to who had discovered the planet, but now history's version is that both Adams and Leverrier share the honors—along with Sir Isaac Newton, whose genius, as Alfred Noyes has said, "found the law that was a lantern to their feet."

In September Neptune is in the constellation of Virgo, and too close to the sun to be observed, even with a telescope. Its magnitude is about 7.7 well below the limit of naked eye visibility. It travels once around the sun in 165 years, at a distance of 2,793,000,000 miles. Its diameter is 31,000 miles, and it is equipped with one satellite, probably bigger than our moon.

Celestial Time Table for September

| Sept. | EST | |
|-------|----------------------------|--|
| 3 | 9:49 a. m. 2:00 p. m. | Moon in first quarter Moon farthest; distance 251,100 miles |
| 8 | 10:00 p. m. 10:00 a. m. | Venus passes Jupiter Venus farthest east of sun |
| 11 | 4:59 a. m. | Full moon |
| 16 | 5:00 a. m. | Moon nearest; distance 229,400 miles |
| 18 | 1:44 a. m. | Moon in last quarter |
| 20 | 10:36 p. m. | Moon passes Saturn |
| 23 | 10:41 a. m. | Autumn commences |
| 24 | 11:00 p. m. | Mars passes Jupiter |
| 25 | 8:46 a. m. | New moon |
| 27 | 8:13 a. m. 10:35 a. m. | Moon passes Jupiter Moon passes Mars |
| 28 | 7:26 p. m. | Moon passes Venus |

Subtract one hour for CST, two hours for MST, and three for PST. Add one hour for the corresponding Daylight Saving time.

Science News Letter, August 31, 1946

RADIO

New Insect Repellent Is CBS Radio Feature

➤ A NEW double-action repellent called 448 that both repels and kills insects will be described on the Science Service radio program, "Adventures in Science," over many of the stations of the Columbia Broadcasting System next Saturday, Sept. 7.

Lieut. Comdr. Michael Pijoan of the Naval Medical Research Institute will be the guest of Watson Davis, director of Science Service, on the program.

The program will be heard at 1:45 p. m. EST., 2:45 p. m. EDT.

Science News Letter, August 31, 1946

MEDICINE

Insulin Aids in Treatment of Alcoholics

➤ ACUTE alcoholics, treated with insulin, can be lured away from drink twice as fast and with greater ease and comfort than by the usual method of gradually withdrawing alcohol from the diet, Dr. Etem G. Vassaf and Dr. Volta R. Hall, of the Ring Sanatorium and Hospital, Arlington, Mass., have found.

Small doses of insulin were given two or three times daily before meals to 43 patients whose "lost weekends" varied from two days to three months. The patients, 29 of whom were men and 14 women, were forced to drink plenty of fruit juices, in a diet of high-calorie and high-vitamin foods. Those who showed signs of tremors, excessive sweating, confusion, or disorientation, were also given injections of vitamin B₁.

Of the patients, 44% required no alcohol after receiving insulin, while in a group of 564 patients who were not given insulin, only 14% could give up whisky at once. The average withdrawal period for the insulin patients was one day, slightly less than half the 2.2 days required by the average alcoholic receiving no insulin.

Nursing and medical staffs agreed that the patients receiving insulin were more contented and cooperative, less restless and fault-finding, and less insistent in their demands for alcohol than were the control patients.

Scientists have long known that the burning of alcohol and its consequent disappearance from the body may be speeded by the catalytic action of simultaneous oxidation or burning of sugar. Drunks, completely "out" in a serious alcoholic coma, have been sobered up in two hours or less and able to walk alone within four hours by injection of both sugar and insulin.

Insulin, administered alone, will speed up the oxidation of blood sugar, otherwise dormant when alcohol is present, and this, in turn, speeds up the elimination of the alcohol itself.

Drs. Vassaf and Hall, reporting their studies to the *New England Journal of Medicine* (Aug. 8), suggest greater future use of insulin in treatment of acute alcoholism.

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Ascarids, internal parasitic worms, may be 90% destroyed without injury to swine, by sodium fluoride in their food.

Do You Know?

Starfish meal compares favorably with sardine meal as chicken feed.

Astronomers have given names, Greek letters, or numbers to all stars visible to the naked eye.

Instead of laying eggs, the fly that causes African sleeping sickness gives birth to one fly.

The successful use of *sulfa drugs* for X-disease on peaches is an example of the new trend toward "artificial immunization" of plants against diseases.

Synthetic esters were made and used in Germany during the war for improving the lubricating properties of special oils for use in cold weather.

One American *turkey farm* has modernized its killing process by using electricity; birds are electrocuted with 450 volts in from five to 15 seconds.

In a properly *air conditioned* home, the absence of warping causes the piano to stay tuned longer, and the doors and windows to open and close easier.

Clothing industries, this year, expect to produce 30,000,000 suits for men; this is 5,000,000 more than the normal yearly production.

The 200-inch *reflector* being prepared for the Mount Palomar telescope will enable astronomers to penetrate twice as far into space and cover eight times the volume of space now open to them.

Sectionalized plywood *barges* proved satisfactory during the war for transporting petroleum products in rivers and along the coast; the sections, bound together by connector bolts, were lined with a synthetic rubber compound.

NEW SUPER 40 POWER TELESCOPE
Not a toy but a precision instrument with 4 variable powers: 10X, 20X, 30X and 40X. Has 53 mm. objective lens.
Fully achromatic.
For nearby objects at wide range; target spotting scope; long distance terrestrial view; for spotting planes, ships & studying stars. Size 27½" extended; 9½" collapsed. Weight 28½ ozs. Price prepaid \$42.50. Write Dept. 11.

Carl Halle Optical Products
10 Malden Lane, New York 7, N. Y.

METEOROLOGY

Weather Stations Abroad

➤ FAR-FLUNG weather stations outside the continental United States are being maintained by the U. S. Weather Bureau to aid transcontinental and transoceanic flying, and hourly reports of weather conditions are being received from stations of other nations. Additional observatories will be established both in American possessions and on foreign soil in cooperation with the countries concerned as found needed. These latter will be operated by the U. S. Weather Bureau only until local personnel have been trained.

Weather Bureau activities also have increased over prewar days within the United States. The Bureau has taken over weather stations at Army posts, now on a caretaker basis, at home as well as abroad. In fact, the Weather Bureau has authority, by order of the President, to take these stations where the needs of international airlines make such action essential. These home stations, added to prewar observatories, give better coverage than ever before.

The Weather Bureau has stations in operation in Alaska and the Aleutians. The Bureau exchanges reports from a hundred stations daily with Russia. The Soviet Union, the U. S. Bureau states, has been very cooperative in converting her reports for use in our historical maps of the northern hemisphere, which are used in long range forecasting and many research projects.

The proposed establishment of additional joint Canadian-United States meteorological stations in far northern Canada is awaiting a complete survey. The purpose of such stations, many of which would be temporary only, is to secure data for the Canadian-United States Joint Defense Board.

Denmark has agreed to let the United States establish a weather station in the northwestern part of Greenland, it is reported. It will be operated by civilians. Among other places for permanent stations are Guam, Wake, the Philippines and Canton island in the Pacific, and Caribbean areas in the Atlantic.

Alaskan and Aleutian stations are essential now that the Great Circle route from the United States to Japan and China is beginning to be used. The fogs and winds that prevail along the Aleutians could cause great difficulties unless pilots were prewarned. The Alaskan stations, together with others in northern

Canada are essential in studying the possibilities of the Polar route from the Western Hemisphere to parts of Europe and Asia.

Greenland stations are an aid on the present short route to Europe by way of Newfoundland and Iceland; those in the Caribbean, to air transportation to South America; and those on Wake, Guam and the Philippines for travel to southern Asia and Australia via Hawaii.

Science News Letter, August 31, 1946

GEOGRAPHY

Alaska Crossroads For World Flying

➤ ALASKA SEEMS destined to become a crossroads in transoceanic flying; its importance in future aviation is now recognized by an allotment of federal money for airport construction.

The allotment just announced by the Civil Aeronautics Administration is for \$1,740,000 for the present year for Alaska, Hawaii and Puerto Rico. The amount may seem small, but when added to millions already spent in constructing airports by the Army during the war, it will go far.

Alaska's importance in transoceanic flying is largely geographical. It lies on or close to the Great Circle routes from American airports to Japan, China, Siberia and other parts of eastern Asia. It is also not far from routes from the West Coast by way of the North Pole to much of Europe and Asia. The Great Circle route to Tokyo, by way of the Alaskan Aleutians, is now in use. The Polar route is under study, and some day may play an important role in air transportation.

Added to the favorable geographical position of Alaska, and the Aleutians, the country has another potential asset of great value in long distance flying. It may be able to refuel crossing planes with domestic gasoline. Drills are now penetrating the earth in the Point Barrow general area exploring to find the petroleum that geologists claim is there. The drillings are being made by the U. S. Navy in an area set aside as a Naval petroleum reserve by President Harding more than two decades ago. If pay-oil is found, a pipeline to Fairbanks and the south coast will be laid.

Science News Letter, August 31, 1946

AGRICULTURE

Soviet Cotton Grows Red

Cotton grown in Russia has fibers naturally tinted red, brown and green. The fibers are short and coarse, but colors do not fade easily.

➤ SOVIET cotton fields are now producing experimentally naturally tinted fibers of brown, red, and green.

These cottons colored by nature fade less than white fibers that are artificially dyed and they have greater resistance against decay, it is claimed in a report prepared for Science Service by N. Konstantinov of the Soviet Scientists' Antifascist Committee.

In a number of cases the chemical nature of naturally colored cotton was established. The brown color of the fibers is caused by a special organic substance of tannin type, so-called catechol. On contact with oxygen in the air the tanning matter is oxidized and forms brown and red amorphous substances which give color to fiber.

Colored fibers have particularly high wax content. According to data of the Moscow Textile Institute, in green-fibered cotton plants this equals 7% to 10% and in white-fibered species 0.7%. The presence of tanning matter and fatty wax substances in fibers gives greater resistance against decay.

It is well known, the report says, that in artificially dyed white fibers the quality deteriorates. Hence fabrics manufactured from naturally colored fibers should be of relatively better quality. Finally, it has been established that such fabrics fade less than those made of artificially dyed white fibers.

The selection of cotton plants with naturally colored fibers was begun in the USSR with the study of such species met with in nature. From among a valuable collection of cotton plants, a fairly large number of species with colored fibers were chosen. These varied from cream through all shades of brown to almost black and included reddish and greenish tints.

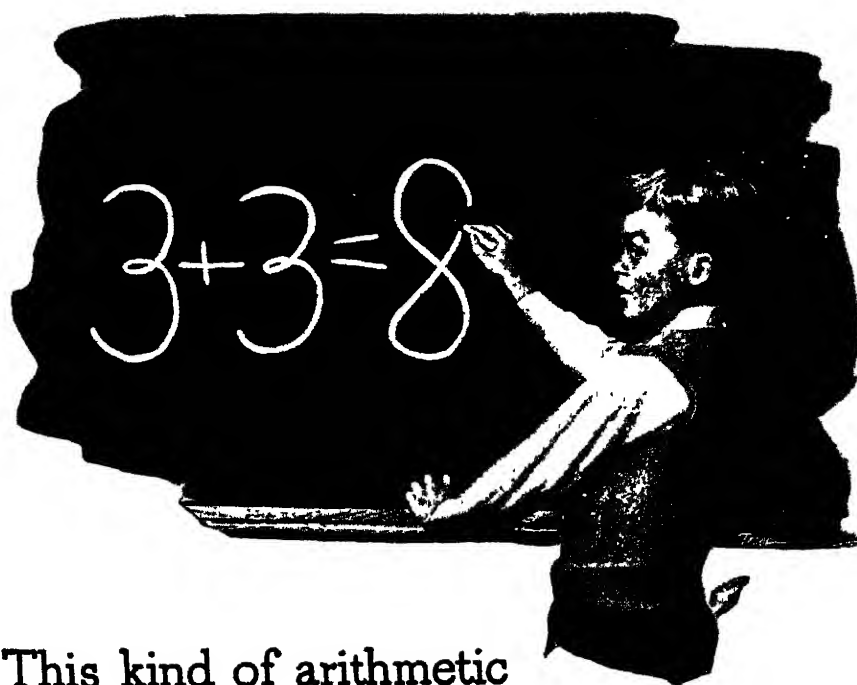
Tests proved that in the majority of cases these fibers were short and coarse, and that crop yield was low. Plant breeders were confronted with the task of improving technological properties of naturally-colored fibers. In recent years considerable successes have been achieved in this direction.

By crossing American cotton plants with naturally colored fibers and white

fiber plant of the same type, B. Straumal of All-Union Cotton Cultivation Research Institute succeeded in a comparatively short time in obtaining a number of brown-hued staples of excellent technological properties, closely approaching those of the best white-fibered varieties. Scientist Straumal's varieties ripen early and yield fairly good crops. The length of staple is 30 millimeters ($\frac{1}{8}$ inch); yield after ginning up to 35% and tensile strength six to seven grains.

A valuable property of these cotton plants is their good resistance to wilt, and these varieties are being propagated for cultivation in fields. Tests of the Straumal varieties showed that catechol when reinforced by salts of iron, copper and chromium gives color to fabrics in no way inferior to the best artificial dyes. Catechol makes it possible to vary shades and gives good decay-resisting properties to fiber. According to specialists, this fiber can be used without additional dyeing for manufacture of colored fabrics.

Of exceptional interest is work carried out by I. Maximenko, selectionist of Turkmenian Soviet Republic, on species of cotton plants with green fibers. As a result of crossing cotton plants of purple-science type with American and American with (Turn to page 143)



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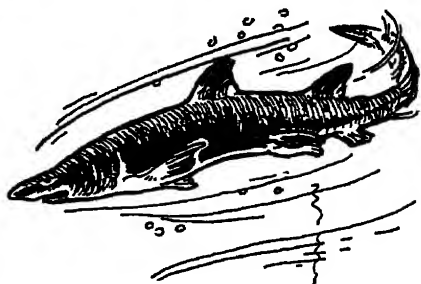
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ICHTHYOLOGY

NATURE RAMBLINGS

by Frank Thone



Toothy Aristocrats

► THE FRIENDLESS estate of sharks is not a matter of their being parvenus. If length of lineage were the only criterion, sharks would have to be reckoned among the highest aristocracy among backboned animals. There were sharks in the sea long before any kind of vertebrates came to live on land, and they were recognizable as sharks when other fish seemed to be uncertain whether they were going to be fish at all.

Sharks set themselves up in the aristocrat business as many another family has done in later time: by having good weapons and using them ruthlessly. Sharks' teeth are so efficient, indeed, that many island tribes in the South Seas, having no metals or hard stones, made their wooden war clubs the practical equivalent of swords by edging them with these three-cornered dental daggers.

The primitive shark tooth is a triangle, with its cutting edges finely sawtoothed. Loosely attached at the base, it comes loose readily if damaged by an over-ambitious bite, and falls out after a time in any case. There are plenty of replacements; most sharks have several rows of

unerupted teeth in their jaws, waiting their turn. There are variants upon this pattern, but all recognizable as belonging to the family.

So much notice has been taken of the teeth of the sharks because they strongly present the shark's chief function—that of an eating-machine. A shark is always hungry, and he is always hunting. Sharks sometimes hunt in small packs, like wolves, and like wolves will turn and rend and devour any member of the pack that gets hurt.

For all their horrid appearance and unappealing ways, sharks have a decided place of their own in the world. Like the wolves to which they are often likened, they keep down the surplus of the teeming life of the sea, and (since their appetites are anything but finicky) they are at once garbage collectors and living incinerators.

Science News Letter, August 31, 1946

AERONAUTICS

Parallel Radio Beams Determine True Air Speed

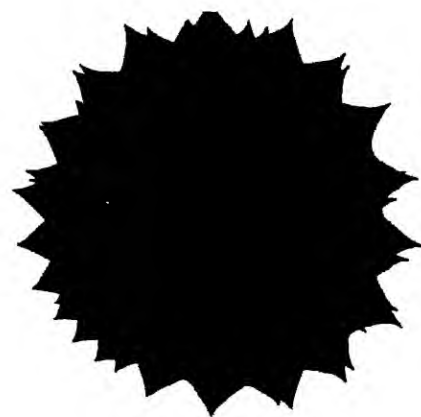
► AN AIRPLANE'S true speed is determined accurately with radio detection beams on the Army Air Forces' speed course at Wright Field, Ohio. Three parallel beams at right angles to the course do the trick.

The speeding planes cut these beams as they pass over the course, and as they cut each beam send a signal to the ground. The time elapse between the signals is compared with the known distance between the beams, and the speed computed. The method may be used with either high- or low-flying planes.

Numerous other methods have been used to measure true air speed, but all were found to have limitations. Various types of instruments installed in planes give approximate but not true speed. A radar system which followed the plane in flight was not sufficiently accurate, while a method of timing by use of vertical wires, cameras and a timing motor was effective only at low altitudes.

The radio beam method operates accurately in any weather and at any altitude, and is the first system capable of measuring speed at or above the speed of sound. A similar installation at Muroc Army Air Base, Calif., will be used to check the speed of rockets and pilotless aircraft.

Science News Letter, August 31, 1946



PORTRAIT OF HAY FEVER—
This needle-pointed black blob is a ragweed pollen grain magnified 12,000 times life size before an electronic microscope camera in the Westinghouse Research Laboratories. In real life the little fiend is one-half of one-thousandth of an inch across, and it floats around the country by the billion, causing sniffing torment to some 3,000,000 tender-membraned American sufferers from hay fever.

BOTANY

Counting Pollen Grains In Air Not Exact Science

► COUNTING pollen grains in the air, which has become a standard public-health job during hay-fever season, is still far from being an exact science. This is indicated by critical studies by Oren C. Durham, technical director of the Abbott Laboratories in North Chicago.

The method now most widely used consists simply in exposing an oiled glass plate for a given length of time, then putting it under a microscope and counting the pollen grains that have stuck to it. This gives a false picture of the pollen content of the air itself, because the rate of fall of the grains differs widely from species to species. Ragweed pollen, for example, falls only one-fifth as fast as rye pollen under carefully controlled still-air conditions.

Mr. Durham has devised collecting apparatus intended to increase the accuracy of air-pollen analysis. He puts the standard oiled glass slide between two large metal plates, which insure that only pollen grains from the air passing between them can fall on the slide.

Science News Letter, August 31, 1946

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Books of the Week

ADVANCES IN COLLOID SCIENCE Vol II Scientific Progress in the Field of Rubber and Synthetic Elastomers—H. Mark and G. S. Whitby, Eds., *Interscience Pub., Inc.*, 453 p., tables and illus., \$7. A book useful in assisting in the further study of synthetic rubbers and of elastomers generally, as well as of natural rubbers.

ADVENTURES IN TIME AND SPACE An Anthology of Modern Science-Fiction Stories—R. J. Healy and J. F. McComas, Eds., *Random House*, 997 p., \$2.95. A collection of thirty-four stories, wherein the caution of the scientist gives way to the imagination of the writer.

COLLECTION AND PRESERVATION OF INSECTS—*Government Printing Office*, 42 p., diags. and illus., paper, 15 cents. Information on the collecting, preserving, handling, mounting and labeling of insect specimens. U. S. Dept. of Agriculture Misc. Pub. No. 601.

EDUCATORS GUIDE TO FREE FILMS—Mary F. Horkheimer and John W. Diffor, Eds., *Educators Progress Service*, 303 p., \$4.

ELECTRIC MOTOR REPAIR—Robert Rosenberg—*Murray Hill Books*—551 p., illus., \$5. An intensely practical, non-theoretical book on electric-motor repair and rewinding that can be used by men with little background of electrical knowledge.

ELEMENTARY TEACHERS GUIDE TO FREE CURRICULUM MATERIALS—John Guy Fowlkes and Donald A. Morgan, Eds., *Educators Progress Service*, 204 p., paper, \$3.50, third ed.

ELEPHANTS—Herbert S. Zim—*Morrow*—illus., \$2. A book that tells with clear simplicity and accuracy all about elephants. It will appeal strongly to younger readers with its simple text and large, clear type, but it is also interesting reading for any age.

FIRST ANNUAL REPORT OF THE DIRECTOR-GENERAL TO THE FAO CONFERENCE—Food and Agriculture Organization of the United Nations, 45 p., paper, free.

THE FLAGELLATE SUBFAMILY OXYMONADINAE—Joy Barnes—*University of California Press*, 162 p., paper, \$1.25

GENERAL BIOLOGY—William C. Beaver—*Mosby*—820 p., tables and illus., \$4.75. A textbook which places emphasis on human biology, penicillin and the other antibiotics, viruses, economically important parasitic worms, the pronunciation and derivation of terms, and human diseases produced by parasitic fungi.

MUSIC IN HOSPITALS—Willem van de Wall—*Russell Sage Foundation*—86 p., paper, \$1. A handbook for those who wish to make their musical contribution to hospitals.

NON-PROJECTIVE PERSONALITY TESTS—Roy Waldo Miner, ed., *The New York Academy of Sciences*, 147 p., paper, \$1.75. Vol XLVI, Art. 7.

OPINIONS ON GAINS FOR AMERICAN EDUCATION FROM WARTIME ARMED SERVICES TRAINING—M. M. Chambers—*American Council on Education*—78 p., paper, 50 cents. A report on the experience and observations of war-veteran students, pointing up some of the possible gains for American education from the huge wartime-training effort.

PERSONALITY PLUS—Sheila John Daly—*Dodd, Mead & Co.*—139 p., illus., \$2. Hints on the correct behavior for teenagers by a teen-ager.

PREPARATION OF AMMONIUM NITRATE FOR USE AS A FERTILIZER—*Government Printing Office*—80 p., tables and illus., paper, 20 cents. U. S. Department of Agriculture, Technical Bulletin No. 912—June 1946.

REEF AND SHORE FAUNA OF HAWAII—Charles H. Edmondson—*Bernice P. Bishop Museum*—381 p., illus., paper, \$3. A condensed pictorial treatise on the marine fauna of Hawaii. Special Publication 22.

WORLD FOOD SURVEY—*Food and Agriculture Organization of the United Nations*—39 p., tables and diags., paper, free. July 5, 1946.

Science News Letter, August 31, 1946

POLITICS

UN Committee Planning International Standards

➤ A LITTLE-KNOWN but potentially important United Nations organization is the UN's Standard Coordinating Committee that is planning international standards for such varied items as airfield lighting and textiles.

Newest of the 18 members of the committee is Russia, and the draft for a permanent international standards group is now being studied by the members in preparation for a conference in London in October.

Latest project submitted to the group includes 94 test methods for textiles, proposed by the American Standards Association.

Other projects for international standardization under consideration by the UN committee include: metal food containers, definition of the term rayon; manganese ore test methods; terms and definitions relating to the heat treatment of steel; plastics terminology; radio interference suppression; airfield lighting; simplification of shellac grades and methods of testing the properties of shellac; standard for sheet and wire gages; machine tools; automobile standards; building standards; and several other subjects for possible international definition and testing.

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From Page 141

Egyptian species, and of further careful selection of their offspring with differently colored staples, Maximenko succeeded in obtaining absolutely new shades hitherto unknown in nature. According to Maximenko's research, the green color of cotton fiber is not chlorophyll and differs in nature from brown coloring. This is indicated by the manner in which the colors appear. Whereas brown, according to Maximenko's observations, appears within 20 to 25 days of beginning of formation of ball, green appears within 30 to 40 days. It was also established that the green coloring changes easily under influence of external factors. For instance, given surplus moisture, green will become almost black and, on the contrary, with insufficient moisture it becomes lighter.

Outstanding shortcomings inherent to green fiber cotton plants are their low crop yield and weakness of fiber. These were successfully overcome by Maximenko. Varieties which he selected from hybrids are already yielding fiber with a higher tensile strength.

Science News Letter, August 31, 1946



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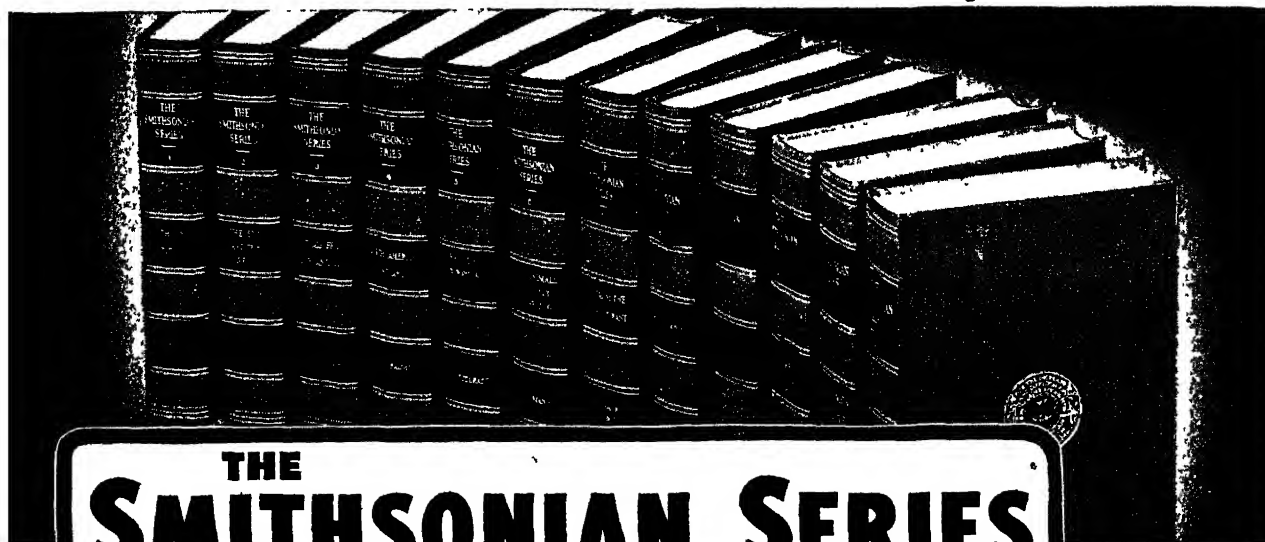
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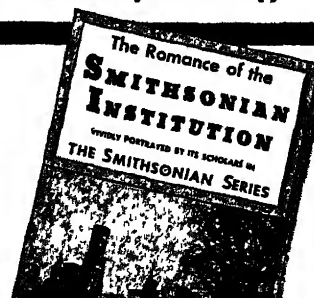
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PSYCHOLOGY

Race Haters Unbalanced

Persons showing extreme prejudice against another race are nearing mental imbalance. Such feelings denote personal insecurity and conservatism.

► PEOPLE who demonstrate extreme racial prejudice are teetering on the brink of mental imbalance.

This was the essence of what Dr. Else Frenkel-Brunswick, University of California psychologist, told the American Psychological Association meeting in Philadelphia in a report on a study of the personality of racially prejudiced persons.

"The racially prejudiced are insecure, though externally they may exhibit confidence and even arrogance," Dr. Frenkel-Brunswick said. "They accuse racial groups of aggression, underlying weakness, preoccupation with sex, etc."

"Actually these are the things which the prejudiced find in themselves, but are unable to face in themselves. Therefore, they project these unpleasanties to others, usually a racial group. It is a mechanism for blaming others for one's own shortcomings. Thus the expression of racial prejudice is used by some to maintain a mental balance which might be lost if these problems could not be projected to others."

Dr. Frenkel-Brunswick's study, sponsored by the American Jewish Committee, is based on the results of questionnaires and accepted psychological tests, such as the Rorschach method. Results reported at the meeting came from the study of 140 college women subjects. She said that the character of the extremely prejudiced in this group hold for as yet unreported results of studies of business men, normal and mentally ill persons, law-abiding citizens, and inmates of a prison.

The personality traits Dr. Frenkel-Brunswick described hold true in their entirety, she explained, only for those who score among the 25% highest on the prejudice test. She indicated that the 25% least prejudiced also exhibit abnormal personality traits, but said that data had not yet been compiled on this phase of the study.

Dr. Frenkel-Brunswick stated that persons who exhibit prejudice against one racial group are prejudiced against all racial groups but their own. She said they have less creative imagination, less insight and capacity for "putting oneself in another's shoes," lack emotional re-

sponsiveness, have less capacity for abstract thinking, and are unable to accept new ideas.

On the basis of the scores they are also characterized by "authoritarian submission and aggression, superstition, conventionality, in-group and family loyalty, anti-intellectualism, anti-emotionalism, and general repression of instincts, vilification of human nature, and a punitive attitude toward people who differ socially."

"A 'fascistic type' conservatism goes hand in hand with prejudice," Dr. Frenkel-Brunswick said. "This type of conservatism advocates taking the law into one's own hands, and using force to return to a mode of life long since a matter of history. This type of conservatism must be distinguished from the true conservatism of American democratic traditions, where extreme prejudice is not often found."

The psychologist said it is interesting to note that inmates of San Quentin prison, all of whom have committed some act of aggression against society, rate high on prejudice. She added that this fits in with the rest of the pattern of the prejudiced personality.

Science News Letter, September 7, 1946

EXPLOSIVES

Mining Made Easier With Shaped Charges

► BAZOOKA-STYLE blasting charges, with hollow noses, promise higher efficiency, lower costs and greater safety in hard-rock mining. This is indicated by results of experimental work conducted at the property of the National Tunnel and Mines Company, Tooele, Utah.

Bazooka projectiles exploding outside the armor of tanks pierced it with penetrating tongues of "hard" flame leaping out of conical hollows cut into the forward ends of their explosive charges. W. T. Warren, general superintendent of the company, decided that the same principle would be worth a try on rock, as it might eliminate a good deal of laborious drilling, or the use of excessively large powder charges plastered on the outside with mud.

He was joined by a former Navy officer, E. O. McAlister, who had wartime experience with underwater demolitions, and is now in charge of the continuing experiments.

The most efficient charge for mining purposes, it was discovered, is a block of ordinary blasting explosive with a hemispherical cavity in the face to be set against the rock. A little space, or "stand-off distance," between charge and rock improves efficiency.

Preliminary results, largely on big boulders on the floor and hanging rock "fingers" overhead, have been highly encouraging. Only a fraction of the labor formerly required for placing the charge is now necessary, and the same demolition effects can be obtained with less than half the powder.

Science News Letter, September 7, 1946

Agricultural experts estimate that one farm rat eats \$2 worth of grain per year and destroys an additional \$20 worth.

Continuous flooding of a rice field, from before or just after seeding until near harvesting time, controls weeds; they cannot get their first leaves into the air, although the rice can.



U. S. Army Air Forces Photo

MAN FROM MARS?—No, an Army Air Forces air crew member in the new pressure suit that will enable airmen to live while flying as high as 62,000 feet. Flying at this altitude without such a suit has previously been impossible for airmen.

AERONAUTICS

Great Circle Route

War developed aircraft equipment makes northern ocean routes usable, enabling transports to fly from New York to Chungking via the Arctic.

► THE "GREAT CIRCLE" route from Seattle to Tokyo, which Army transports will fly on scheduled trips, is but one of several Arctic or near-Arctic routes that will be followed in the future by both commercial and military planes. Distance-saving is the reason; war-developed aircraft equipment makes these northern trans-oceanic flights possible.

The announced Army short route to Japan skims the south-central bulge of the Aleutian islands that stretch from Alaska mainland to Siberian Kamchatka peninsula. Between Seattle and Tokyo planes will make one stop, at Adak, a halfway point. This route is a little more than 4,700 miles, while the present regular route from California to Japan by way of Hawaii and Guam is nearly 8,000 miles.

From New York to Tokyo, following the Great Circle route, planes would travel about 6,700 miles, and would pass over northern Alaska, eastern Siberia and Kamchatka, and the Kurile islands. From Chicago planes would cross Alaska at about the central college city of Fairbanks.

Transatlantic planes now follow Great

Circle routes, or nearly so, in some instances. These are the planes that cross Labrador, and pass just south of Greenland and Iceland. From New York to Moscow by this path, the distance is roughly 4,700 miles, approximately 1,000 miles less than by way of Spain.

Great Circle routes from important American centers to certain Asiatic cities pass close to the North Pole. The route from New York to Chungking, the war capital of China, is one, for example. To reach one of these two cities from the other by air, planes would pass close to the Pole, would travel approximately 7,600 miles as compared with between 11,000 and 12,000 miles via Hawaii. Also from California to Tehran, the capital of Iran, aircraft would cross the Pole, but the air distance is only some 7,400 miles.

The cold weather encountered on these "top-of-the-world" routes no longer is a serious handicap to airplane traffic because of wartime developments. Included are de-icers to keep wings and body free of ice, static dischargers to eliminate troublesome electric charges, accurate altimeters, radar equipment, and loran, by which planes may know their geographical positions at all times.

Science News Letter, September 7, 1946

taken after the patient developed malaria showed no malaria germs.

A blood smear with no malaria germs, however, is not proof that a person is free from the parasites, Dr. Teasley points out. No diagnostic test is known which will definitely rule out malaria in a carrier who has been free of symptoms for a long time.

Putting quinine into stored blood at a strength of one to one thousand will not prevent the occurrence of malaria after transfusion, and some scientists have reported that the malarial parasites can live for weeks in blood stored at almost freezing temperature.

Two rules that may help to avoid transmission of malaria by transfusion

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MEDICINE

Malaria from Transfusion

Blood of a malaria carrier given in transfusion can cause the disease. Two rules are given to avoid transmission of malaria by this method.

► THE DANGER of getting malaria from a blood transfusion has become a real possibility with the return from overseas of sailors and soldiers and a host of non-combatant men and women who were exposed to the disease, two Mayo Clinic physicians warn.

The case of a man who had never been in a malarial region and who developed malaria in December when the temperature was below zero, when it was most unlikely he could have got it in the usual way from a mosquito bite, is reported by Dr. Gerald H. Teasley.

The man had been injured in an automobile accident while away from home and was given three blood transfusions. One of the donors, it was found, was a soldier who had served in the Pacific area for 13 months, taking atabrine daily during that time.

The soldier did not have malaria while overseas, but after his return when he stopped taking atabrine he had five or six attacks. The hospital personnel who examined his blood when he served as a donor did not ask any questions about malaria. A thin smear of his blood

are given by Dr. Thomas B. Magath. These are: "1. If the prospective donor has been in a malarial area and has had an attack of malaria, he should not be used as a donor for at least two years after leaving the zone, provided he discontinued suppressive treatment (atabrine or quinine) then and has not had any recurrences of malaria for at least two years previous to his donation. Before donation a thick smear of blood

should be examined and found to be negative.

"2. If the prospective donor has been in a malarial area and has not had any attack of malaria and for the past year has not taken any suppressive treatment, he may be used as a donor, provided a thick smear of blood does not reveal any parasites. The history of undiagnosed fever or a questionable history should cause the application of rule 1."

Science News Letter, September 7, 1946

METALLURGY

U. S. Makes Manganese

An electrolytic method developed by the Bureau of Mines may enable steel industry to make its own manganese, eliminating need for imports.

➤ ANOTHER lesson of the war is that America can produce its own manganese, a number-one essential in making steel. However, it cannot do it yet at a cost low enough to compete with ore from foreign countries. A low-cost method would mean independence from importation.

An electrolytic method, developed by the U. S. Bureau of Mines, details of which have been released recently, may be the answer. During the three years that its Boulder City plant has been in operation, it has produced over a million pounds of electrolytic manganese. This is only a small part of the requirements, however.

Despite the fact that the United States has large deposits of manganese ore, nearly all the manganese requirements of the steel industry before the war were imported, the Bureau states, because most of the domestic ores are low-grade and have proved difficult, and in some instances impossible, to concentrate to ferro-grade by ore-dressing methods.

The Bureau feels, however, that it has successfully demonstrated the technical and commercial feasibility of electrolysis in beneficiating low-grade manganese ores, particularly where the raw materials and electricity are available. It has just issued a publication reporting the process.

For every ton of steel produced in the United States, an average of over 13 pounds of manganese is used. Most of it is in the form of ferromanganese. During 1940, nearly 45,000 tons of manganese were produced in the United States, but over 1,400,000 tons were imported. In 1944, domestic production was

five times as great as in 1940, and importation had decreased slightly.

In the production of ferromanganese, and other usable manganese compounds, America does better. The home production is about four times the imports. Imports of both manganese ore and ferromanganese come in normal times from Brazil, Chile, Cuba and Mexico, in the Western Hemisphere, and from Africa, India and Russia. The Soviet Union occupies a favorable position in steel production because it has, in the Ukraine, iron ore, manganese, limestone and coal all relatively close to each other.

In the steel industry in the United States, open-hearth operations are the greatest users of manganese. The manganese is added to the open-hearth melt as an alloying agent to increase tensile strength, and to remove surplus oxygen and sulfur. Manganese in pig iron is desirable in removing sulfur.

Science News Letter, September 7, 1946

INVENTION

Automatic Phonograph Holds Records Upright

➤ AN AUTOMATIC phonograph that holds records up edgewise while it plays them, instead of laying them flat, is the unique invention on which U. S. patent 2,406,355 has been awarded to Joseph A. Darwin of East Orange, N. J., and Robert Robertson of Kearny, N. J.

Instead of one tone arm this instrument has two, with oppositely placed needles. First the record is turned in one direction while the left side is being played, then the direction is reversed, the right-hand needle is set in the playing

groove until that side is finished. Then both tone arms are disengaged, and at the same time the pivot-bearing arms that have held and rotated the record release it and move on to pick up the next.

The records stand on edge with separating sheets between them, more or less like the long-familiar record volumes; the automatic selecting mechanism flips them open at the desired spot and stands up the record to be played so that the mechanism can engage it. If no particular selection is indicated by pushing buttons, the machine will play one record after another all down the row, then start back and play them all again in reverse order. It can, however, be stopped at any point.

It looks as if juke-boxes equipped with this mechanism ought to rake in the nickels faster than ever, since less time is required for changing records. By the same token home-concert enthusiasts bent on a solid evening of Beethoven will find the program flowing more smoothly and with fewer interruptions filled with the noises of clicking machinery.

Science News Letter, September 7, 1946

GENERAL SCIENCE

Judges Named for Science Writing Award

➤ SEVEN JUDGES for the first annual George Westinghouse Science Writing Award, sponsored by the American Association for the Advancement of Science, have been announced by Dr. Willard L. Valentine, chairman of the awards managing committee and editor of the journal *Science*.

The judges are: Dr. Morris Meister, director of the National Science Teachers Association and principal of the Bronx High School of Science, New York, chairman; Wilbur Forrest, assistant editor of the New York Herald-Tribune and president of the American Society of Newspaper Editors; W. S. Gilmore, editor-in-chief of the Detroit News; Dr. James B. Conant, president of Harvard University and president of the AAAS; Anton J. Carlson, professor emeritus in physiology, University of Chicago; Miss Sally Butler, Indianapolis, Ind., president of the National Federation of Business and Professional Women's Clubs; and Senator Elbert D. Thomas of Utah.

The \$1,000 award winner for the best newspaper science story of the year will be announced late in December.

Science News Letter, September 7, 1946

ENGINEERING

Streamlined Luxury Liners

➤ OCEAN LINERS are going super-modern. Luxury liners will be long, narrow and sleek, truly streamlined. They will have little of the familiar upper structures of smoke stacks, lookout towers, masts, bridges and radio antenna. They will be larger and faster than any ever built in this country.

These vessels, already designed with working drawings and specifications prepared for shipbuilders, will be as unique in appearance as some of the aircraft under flight tests and automobiles promised for 1950. Though stripped of familiar markings, they have beauty and dignity.

Two such vessels are designed by the U. S. Maritime Commission for duty on the Pacific; others are intended for South American and Mediterranean routes. Bids for the construction of these two have already been called for. They will be known as Great Circle Liners, and will be speedy enough to travel from the West Coast to Tokyo in eight days.

These liners will be 920 feet long, with a deadweight tonnage of 12,500, and will be able to cut through the open sea at 30 knots. Each will accommodate 1,238 passengers, and will be manned by a crew of about 500 persons.

The weather deck surface is one of the striking features of these ships. It is not a single surface as in aircraft carriers, but has three elevations, each smaller than the one below. This permits both open and covered promenades. The upper, centrally-located sun deck extends

for more than half the length of the boat and has a fully equipped theater, as well as a circular play spot with band stand, dance floor, lounge and bar. The view of the ocean from it is unobstructed in every direction.

Aluminum in large quantities is specified in the construction of these vessels. Almost all the superstructure, starting from a point one-third aft of the bow, will be built of this light metal. This gives stability, permits a beam of only 86 feet, and enables the vessel to make greater speed with less horsepower than ever obtained before in ocean liners. Both vessels will be powered by burning oil.

Science News Letter, September 7, 1946

PHARMACOCHEMISTRY

Better Skin Ointments With Penicillin May Come

➤ BETTER penicillin ointment for skin conditions such as impetigo and for burns may be coming as a result of studies reported at the meeting in Pittsburgh of the American Pharmaceutical Association.

Use of some of the newer wetting agents, familiar in soapless shampoos, made the most satisfactory ointments of many tested, M. L. Neuroth, Glenn L. Jenkins and C. O. Lee of Purdue University School of Pharmacy found.

The tests, made with a new method devised in the Purdue laboratories, were for determining how long the penicillin remained active in the various bases.

Addition of small amounts of sodium

citrate and urea helps to keep the penicillin in the ointment active against germs, the scientists also found.

Sinus sufferers and nose specialists will welcome the finding that adding ephedrine sulfate to penicillin solutions causes only slight loss of penicillin stability. These studies, by Victor P. Seeberg, Doris Jane Brown and Fredrick J. Johnson of the Cutter Laboratories, Berkeley, Calif., were made following reports of treatment of sphenothmoiditis with penicillin applied locally, together with spraying of a substance such as ephedrine for constricting blood vessels.

Science News Letter, September 7, 1946

ZOOLOGY

Giraffe Born at National Zoological Park

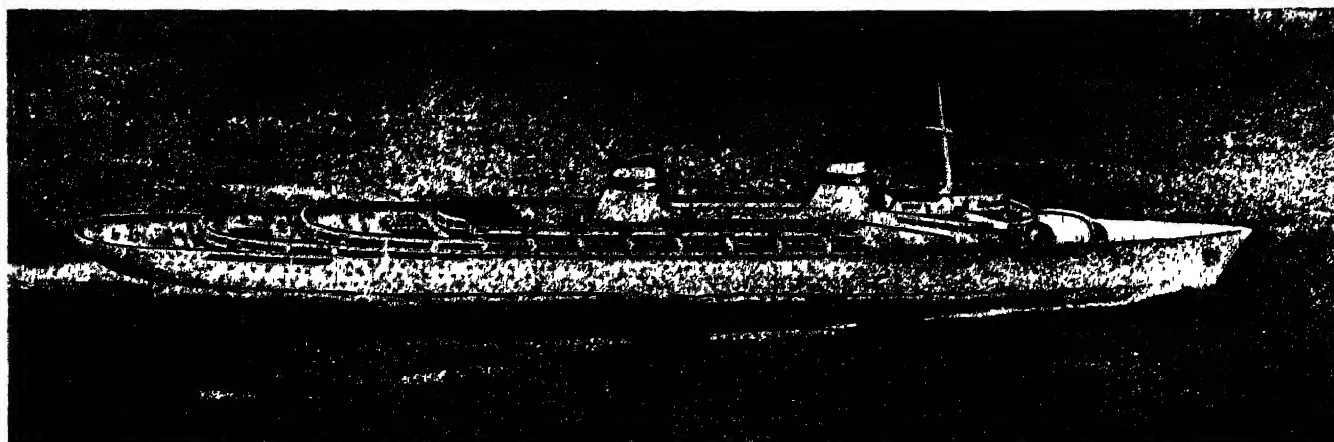
See Front Cover

➤ BIRTH of a new giraffe at the National Zoological Park in Washington, D. C., on Aug. 23 was announced by Dr. William H. Mann, director. The baby, which is a female, was about four feet tall and weighed a little less than 100 pounds at birth, has been named Twiga, which is the word for giraffe in the Swahili language. The mother's name is Spring Song, and the father's is Nageoma.

The picture on the front cover of this SCIENCE NEWS LETTER is of Twiga and her mother the day after she was born.

Science News Letter, September 7, 1946

Vanillic acid esters, which recent tests have shown to be potent against molds and heat-resistant bacteria, may become substitutes for sodium benzoate as preservatives for fresh fruit juices, cheese spreads and bread.



STREAMLINED—Long, sleek and narrow, new luxury liners are planned by the U. S. Maritime Commission. They will be speedy enough to go from the West Coast to Tokyo in eight days.

PSYCHIATRY

Preventing Mental Breaks

Relieving stress factors, a system designed to lessen psychiatric casualties in the war, would contribute to the mental health of industrial workers.

➤ ARMY EXPERIENCE with mental breakdowns, which it is now revealed occurred at a high rate during the fighting in North Africa and Italy, may help prevent similar breakdowns in the civilian population, Dr. John W. Appel and Dr. Gilbert W. Beebe of Philadelphia, both former Army officers, report in the *Journal of the American Medical Association* (Aug. 31).

Find the cause of unbearable stress in a situation that can be changed and change it, is the essence of the Army findings that would help civilian mental health.

Their report "was without doubt one of the most important psychiatric documents in this war," Brig. Gen. William C. Menninger, director of the neuropsychiatry consultants division, Office of the Surgeon General, states in a note pre-facing it.

The Army Chief of Staff personally sent copies of the original report to Gen. Eisenhower in Europe, to Gen. Mark Clark commanding the Fifth Army in Italy, and to Gen. MacArthur in the Pacific. Gen. Eisenhower in turn had it reproduced and distributed to the headquarters of each army, division and regiment in the European theater. It was similarly widely circulated in the Pacific theater, sometimes as "required reading" for every line and medical officer of the units.

Some of its recommendations, particularly for relieving infantrymen after a set period of combat duty, were carried out in the European theater. This was adopted as official policy by the War Department in Washington in March, 1945. Prior to V-J day plans were made for its application in the final campaign against Japan. An aggregate of 120 combat days was suggested as the limit of the period of combat duty for infantrymen, after which they were to be returned to the United States for 30 days rest and recuperation with the option of base area jobs on their return.

The basis of this recommendation and others for short-term rotation to afford a few days rest for men in forward areas, for improving morale by constant reassurance from commanders on why the

men must continue to fight, and for sending replacements in small units rather than singly, came from Dr. Appel's findings at an "exhaustion center" in Italy, at casualty clearing stations and during brief experience with infantry troops during combat.

Neuropsychiatric casualty rates ran as high as 1,200 to 1,500 per 1,000 strength per year for short periods in the North African theater.

"Psychiatric casualties are as inevitable as gunshot and shrapnel wounds in warfare," Dr. Appel and Dr. Beebe declare. It is a simple fact, they explain, that "the danger of being killed or maimed imposes a strain so great that it causes men to break down."

The measures advised for preventing the loss of manpower due to psychiatric casualties were largely changes in the infantryman's environment. Knowing that he would be relieved from combat at a set time, instead of having to go on until he was injured, killed or broke mentally, made it possible for him to fight on until that time came. Rest, food, clothing, promotions, luxury articles and the like were other items of the soldier's environment important to his mental health which could be planned or arranged to help prevent breakdown.

Wages, hours, working conditions, priority rights, promotion systems, selection procedures and incentive systems similarly have a bearing on the mental health of industrial workers, the former Army officers point out. Changes in these can be made to contribute to the mental health of the population. The success of such undertakings depends on finding the stress factors that are important causes of psychiatric disorders in the population and that can be changed.

Science News Letter, September 7, 1946

FOOD TECHNOLOGY

Meat "Floats Through Air" In Dehydrating Process

➤ MEAT HAS always been a difficult problem in the relatively new food dehydration industry, primarily because those portions that come into contact

with the metal trays or wire drums of conventional drying units are likely to be "overdone." To obviate this difficulty, William A. Noel, a U. S. Department of Agriculture engineer, has invented a meat-dehydrating machine in which the particles of ground meat are blown upward in a blast of hot air and kept dancing about in contact with nothing solid at all until the drying process is complete.

Fat, tried out in liquid form during the process, finds its way into a collecting duct at the bottom and is saved separately. When the lean part of the meat is well dehydrated, it is blown into a cyclone separator, where it is whirled down to the bottom and drawn off for packing.

U. S. patent 2,406,395, issued on this machine, has been assigned to the government.

Science News Letter, September 7, 1946

BIOCHEMISTRY

Levulose, Fruit Sugar, Will Aid Research

➤ A PILOT plant in Boulder, Colo., is producing a sugar of high sweetness that won't help the rationing situation but may reveal secrets of the human body's processes. The sugar, levulose, or fructose or fruit sugar, will be available for the first time in sufficient quantities for experimental work by scientists, Dr. Carl W. Borgmann of the University of Colorado Engineering Experiment Station reported.

A simple natural sugar with potential uses in food industries, levulose is known to be important in the human body starting in early life. Scientists have previously been handicapped by lack of this sugar in research experiments.

Operated on a grant from the Sugar Research Foundation, the pilot plant here uses an ion exchange process to obtain levulose from common sugar or beet molasses.

Dr. Borgmann said that studies are now being carried on at the Michael Reese Hospital, Chicago, to find out more about the storage of levulose in the body, its use by various organs and its effect on blood lactic acid, while Dr. I. M. Rabinowitch of the Montreal General Hospital is studying the rate of absorption of levulose in the body.

Levulose with radioactive carbon 14 may be used in future studies to follow the course of the sugar through the various body organs.

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MEDICINE

Use of Mineral Oil Has Health Repercussions

► THE OIL and fat shortage is having health repercussions.

In New York State numerous cases of stomach and intestinal upsets have been occurring. Health authorities ascribe them to mineral oil used as a substitute for edible oils in salad dressings.

In California patients have rushed to their doctors with frightening and embarrassing symptoms which were traced to mineral oil used in salad dressing and Italian spaghetti.

Use of mineral oil in salad dressings has now been prohibited in New York State. The U. S. Food and Drug Administration considers mineral oil salad dressings as adulterated under any form of labelling. The American Medical Association repeats its warning that taking mineral oil can seriously interfere with the absorption of carotene from which the body makes vitamin A, and of vitamin D, calcium, phosphorus and vitamin K, and that it should be used only under the supervision of a physician.

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MYTHOLOGY

Ancient Egyptian Queen Was Early Isolationist

► A NEW concept of Daluka, a great virgin queen of ancient Egypt, who built a wall around her country to become one of the world's first known isolationists, is presented in a study by Dr. Henry Lutz, professor of Egyptology and Assyriology at the University of California.

Queen Daluka probably was a goddess of the ancient Egyptians who through the evolution of myths was reduced to the level of humanity, Dr. Lutz points out. She ruled, according to Arab myths, 1,600 years before Christ, assuming royal power at 160 years of age and ruling for 20 years.

Daluka, the myths add, was elected queen by the women of Egypt after the flower of that nation's manhood was destroyed when the Red Sea engulfed Pharaoh and his hosts while they were pursuing the Jews.

"Queen Daluka is described as a woman gifted with intelligence, knowledge, and experience," Dr. Lutz says in a monograph just printed by the University of California Press. "In order to

safeguard Egypt against foreign attack, she fortified the country by constructing a wall which encompassed the whole land, made a fosse (moat), set up bridges and ballistas (ancient engines for hurling missiles), and placed guards and weapons at an interval of every three miles. Additional protection was furnished by means of magic, for which she had recourse to an old sorceress named Tadurah."

Dr. Lutz says that Daluka's policy of isolating Egypt from the rest of the nations was felt for almost four hundred years. She never married, and there is no mention in available records of her death.

Her virgin status and factors in the myths about her strongly indicate Daluka may be identified originally as Neith, the great goddess of Sais and the western Delta regions of Egypt, Dr. Lutz says.

Dr. Lutz adds that his study is intended not to elaborate the myths as fact, but to evaluate them as mirrors of historical actuality.

Science News Letter, September 7, 1946

CHEMISTRY

DPE Kills Mosquito Larvae But Not Fish

► A CHEMICAL relative of DDT which will kill mosquito larvae without harming fish has been found by Prof. W. T. Sumerford and Dr. Eugene P. Odum of the University of Georgia.

DPE is the name Prof. Sumerford gave the compound in his report to the American Pharmaceutical Association in Pittsburgh. It takes 100 times as much of the compound to kill goldfish, and 10 times as much to kill top minnows, as to kill mosquito larvae, he found.

Fisheries men and conservationists may be relieved of their worry about destruction of fish as a result of DDT sprays and dusts distributed over inland water to kill mosquitoes, since the new DPE might be used instead. Suburbanites may also be able to keep their ornamental goldfish ponds without creating a mosquito nuisance or menace.

DPE is DDT minus some of its chlorine. In previous attempts to find a chemical that would be less deadly to fish and still able to kill insects, the Georgia scientists tried substituting fluorine and iodine for the chlorine, but the resulting compounds were even more deadly to fish. The DDT minus some chlorine was first reported by A. Baeyer in 1872.

Science News Letter, September 7, 1946



ASTRONOMY

Faint Comet Never Entirely Disappears

► A FAINT comet that never entirely disappears has been located in its wanderings across the heavens.

For years the Schwassmann-Wachmann comet, discovered in 1925, has been thought the one that could be seen throughout its entire course around the sun. Now comet Oterma, discovered just three years ago, has been found to be another that is eternally with us.

Comet Oterma was recorded by Dr. G. Van Biesbroeck of the Yerkes Observatory of the University of Chicago on plates made with the 82-inch reflecting telescope of McDonald Observatory of the University of Texas. Although almost a 19th magnitude object, so faint it can be picked up only with the largest telescopes, the comet was within a month of being at its most distant point from the sun, states Dr. Otto Struve of the Yerkes and McDonald Observatories.

Science News Letter, September 7, 1946

BACTERIOLOGY

Food Germs Withstand Penicillin, Streptomycin

► HOPE THAT penicillin or streptomycin might be used to keep milk and other foods from spoiling by overcoming the germs that cause food spoilage dwindles with latest findings.

Streptomycin in ordinary concentrations has very limited activity against bacterial spores such as might cause food spoilage, Harold R. Curran and Fred R. Evans, of the U. S. Department of Agriculture, report in the *Journal of Bacteriology* (July).

Penicillin, they also conclude, "has no application in the preservation of food," though in combination with mild heating it might be useful as a preservative or might help delay spoilage in certain nonfood materials.

Reason for penicillin's failure as food-preserved: the antibiotic can kill spores of a wide range of germs, but some spores are resistant to its action. If a very few of these were in the food, penicillin could not stop their spoiling it.

Science News Letter, September 7, 1946

FIVE FIELDS

BALLISTICS

New Bomb for Planes Flying at Speed of Sound

➤ NEW BOMBS must be developed for speedy jet-propelled and rocket planes, the War Department announces. Existing bombs cannot be dropped accurately from planes traveling near the speed of sound.

This has been determined in the Army Ballistic Research laboratories at Aberdeen, Md., by tests in its supersonic wind tunnel and in its free-flight aero-dynamic range.

Just what shape and size will make bombs of the supersonic era effective will depend upon results of studies now in progress, Army officials state. The bombs themselves must be able to fall considerably faster than the present type, have less wind resistance and be more sensitive. One scientist says that they may be of the "Buck Rogers" type.

Science News Letter, September 7, 1946

PSYCHOLOGY

Roosevelt Top Man in History, Says German Youth

➤ GERMAN youth have voted Franklin D. Roosevelt "the greatest man in world history," a poll reported by an American psychologist revealed.

The German young people, 14 to 18 years old, ranked FDR above Bismarck and Frederick the Great, with Hitler a poor fourth.

Asked the same question, American high school-agers put the late World War II president at the top of their list with Lincoln second, and Christ third.

Psychologist Donald V. McGranahan, of Harvard University, conducted the anonymous poll of German youths while in Germany and reports his findings in the *Journal of Abnormal and Social Psychology*.

Showing a marked preference for political and military leaders, the Germans even ranked President Truman in a tie for seventh place with Charlemagne. The 391 German youths in Friedberg and Offenbach voted as follows for history's leading men:

Roosevelt, 63; Bismarck, 50; Frederick the Great, 49; Hitler, 19; Eisenhower,

14; Stalin, 14; Charlemagne, 8; Truman, 8; Caesar, 6; Alexander the Great, 3; and Napoleon, 3.

The 986 American high schoolers from various sections of the country listed their heroes this way:

Roosevelt, 336; Lincoln, 227; Christ, 157; Washington, 98; Columbus, 24; MacArthur, 23; Edison, 23; Caesar, 18; Benjamin Franklin, 12; and Eisenhower, 11.

Outside the top heroes, American votes ranged from Mark Twain to "atomic bomb discoverer," while the Germans included the Pope, Goethe, and Churchill.

Summing up the preferences listed by the German youth compared with the American choices, Mr. McGranahan said, "In psycho-analytic terms, the German seeks to be a father and a son, but not a brother."

Science News Letter, September 7, 1946

PHYSICS

Two New Secrets About Atomic Bombs

➤ TWO MORE bits of information about the atomic bomb have been allowed to escape from behind the "iron curtain" of atomic energy secrecy.

The size of the critical mass of the atomic bomb, that is, the size that the active plutonium must be before it will go off explosively, is now known to be between 22 and 66 pounds. This has been stated in a British report.

Previously the limits were between 4.4 pounds and 220 pounds as stated in the famous Smyth report issued in August, 1945, by the War Department.

The new minimum size of the bomb confirms the idea that not very much of the fissionable element is needed to make a bomb. The actual bomb may, of course, be much larger than the minimum amount necessary.

The other information is this:

Another chain-reacting substance, probably an element, other than plutonium, can be manufactured. It can be made through use of uranium and thorium, but uranium is necessary to start with. This is the reason that the State Department report on international control of atomic energy proposed putting thorium as well as uranium under atomic control. The 235 isotope of uranium and the element plutonium manufactured from uranium are the only two elements that it has hitherto been known could be made into atomic bombs.

Science News Letter, September 7, 1946

ICHTHYOLOGY

"Twilight Sleep" Given To Spawning Trout

➤ "TWILIGHT SLEEP" for fish makes it easy for spawn takers to extract the eggs. The fish are put to sleep by ether instead of morphine and scopolamine used for humans.

In an attempt to improve artificially upon nature's spawning methods, trout are ordinarily netted or trapped en route to their ancestral spawning grounds and retained until "ripe" for spawn extraction. This is done by experts who must manhandle the squirming trout in their attempt to extrude ripe eggs and milt. Because of their microscopic scales and heavy mucous covering, trout in particular have been the bane of the spawn-extractors' existence.

Like old-fashion human child-birth, artificial spawning of trout seems destined for revolutionary changes. At the Henrietta hatchery in Michigan, workers experimented with anesthetizing trout by pouring ether into the water. Results were so spectacular that spawn-takers are now enthusiastic boosters of "twilight sleep" for expectant trout.

In one experiment, almost a million eggs were stripped from etherized trout in half the time usually required. In addition, the percentage of "delivered" eggs that eyed up—denoting fertility and normal generation—nearly doubled.

Science News Letter, September 7, 1946

CHEMISTRY

Bakers' Cheese Made From Dried Skim Milk

➤ CHEESE for pies, cakes and other soft pastries can be made from dried skim milk by a process developed by dairy experts of the U. S. Department of Agriculture. This method enables bakers to make cheese from the relatively non-perishable dried skim milk as need arises.

The dried milk is reconstituted with a quantity of water, producing a milk higher in solids than normal milk. A good lactic starter and a small amount of rennet are added. Then the reconstituted milk is allowed to coagulate for 4 to 16 hours, depending on the temperature. When firm, the curd is placed in muslin bags and allowed to stand until most of the whey has drained off. It is then ready to be used.

Science News Letter, September 7, 1946

BOTANY

Weed Gives Botany Lessons

Flower of *Datura*, or jimsonweed, is classic material in study of genetics, and especially in understanding of mechanics of pollination.

By DR. FRANK THONE

➤ WEEDS CAN be useful. Even so unpromising a plant as jimsonweed, coarse, rank-smelling and poisonous though it is, proves as good as a lily and better than a rose when it comes to teaching the basic facts about plant life.

It is better for this purpose than most of the more seemly and conventional flowers in one quite important respect; its blossoming season is much longer. It opens up its first big white flowers (which are really attractive-looking until you get within smelling range) early in the summer and keeps right on opening more of them until decisive autumn frosts make it stop. It is therefore available practically throughout the summer-camp season, and remains so for a month or more after the opening of the regular school term. Jimsonweed therefore is one of our real nature-study resources, if we can only bring ourselves to overlook its rather bad company manners.

Aids Genetics Study

Jimsonweed has not gone wholly unappreciated. One of this country's leading geneticists, Prof. A. F. Blakeslee, used many species of the genus *Datura* (which is botanists' Latin for jimsonweed) in demonstrating how heredity works in plants. He had, at the Carnegie Institution's Station for Experimental Evolution at Cold Spring Harbor, Long Island, a great array of greenhouses in which he grew practically nothing but hundreds of thousands of hybrid jimsonweeds of all sizes and shapes; and outdoors in a good-sized field there were hundreds of thousands more. Now, at Smith College, he is still carrying on some phases of this work.

Along with him worked other botanists. One of them, Prof. John T. Buchholz of the University of Illinois who worked at Cold Spring Harbor during the summer months, made some very striking demonstrations of how pollen grains act in producing fertile seed, and what may go wrong sometimes when the pollen of one species is

unable to fertilize the flower of a different species to form a hybrid.

The jimsonweed's flower is especially suitable for experimental work of this kind because it is big and relatively simple in structure, so that its parts can be taken out and handled relatively easily. That is an important matter when hundreds, even thousands, of dissections and microscopic examinations must be made as rapidly as possible.

By the same token, the jimsonweed's big, simply-built flower is well adapted for the less exacting, non-microscopic research of those who are not professional botanists.

The first thing we notice about it is its wide-flaring, trumpet-shaped corolla. There are no separate petals as in many common flowers; yet we can see where the lines of division might once have been, along the creases halfway between the projecting little points around the rim. This conspicuous structure, white, sometimes purple-marked, is the plant's advertisement to bee and long-tongued moth: "Nectar on tap here." For some reason, these insects are not repelled by the plant's ill scent.

The lure of promised nectar, of course, is the plant's promise of a fee for the transfer of pollen from one flower to another, so that crossbreeding may result,



NECTAR ON TAP—Wide-open white flower of the jimsonweed (*Datura*) is an invitation to bees and other insects to take its pollen and nectar. It provides an excellent natural means of studying the basic facts about plant life.

rather than debilitating inbreeding. Bees aren't always satisfied with nectar in payment, and take a load of pollen along to the hive instead, if there is need for more protein there instead of carbohydrate. (Pollen grains are bees' soybeans.) It doesn't bother the flower to be robbed of part of its pollen—there's always a surplus of that.

In making its collection, whether of nectar or pollen, the visiting insect is very likely to brush its pollen-dusted body against the sticky tip of the pistil, in the base of which the seeds will be formed. This sticky tip, called the stigma by botanists, is in some flowers borne on a long, slender, rod-like structure known as the style. The style is especially well-developed in the jimsonweed flower.

Not the Whole Story

It is at this point, with the pollen grains on the stigma, that first lessons in nature study usually stop. But it is really only the beginning. There is no magic influence, telegraphed down the style to the unfertilized egg-cells below, commanding them to go ahead now and form seeds.

The egg-cell is in a way only half a cell. The nucleus it contains has only half the heredity-bearing chromosomes necessary for the development of a normal plant; the other half are in a nucleus up there in the pollen grain, and the two must be brought together and fused into one cell before the seed can begin to develop.

The process, though too microscopically fine to watch with the unaided eye, is a fascinating one. Each pollen grain left on the stigma germinates almost as if it were itself a seed. What emerges might almost be mistaken for an extremely slender root—a thin-walled filament of living material that grows down through the soft tissue inside the style as a root grows down through the soil. Dozens of these filaments (they're called pollen tubes) find their way down the length of the style toward the egg-cells at its base. A powerful chemical attraction spurs them on.

While the pollen tube is growing, the fertilizing nucleus lags somewhat behind its tip. But when growth is finished, near the unfertilized egg cell, the nucleus moves forward, finds its way to



POLLINATION—Bumblebee is taking pollen from the stamens of a *Datura*, in this closeup photograph by Lynwood M. Chace. Nature's purpose is accomplished by the bee carrying pollen from one flower to another.

its mate, and the two fuse into one.

Immediately this cell divides again, and the two resultant cells do likewise, and so on for thousands upon thousands of divisions, with changes in arrangement and structure that finally produce the seed.

The process just described may be called the normal one. It is what has to happen for every fertile seed produced by ordinary pollination. There are, however, departures from the normal, which

may frustrate the whole procedure, especially when efforts are being made by plant breeders to use strange pollen for the production of hybrids. Some of these troubles were traced to their causes by the researches of Prof. Buchholz.

One common cause of failure is the failure of the pollen tube to grow long enough. Either through weakness on its own part or because of chemical hostility encountered in the tissues of the style, a tube may stop growing. If it does, of course its usefulness is at any end. One way of evading this difficulty is by cutting off part of the style and letting the pollen-tube get started that much closer to its goal. This is a hint that practical plant breeders have found useful with plants more valued than jimsonweeds.

Another source of trouble, and one much more difficult to get around, is a more marked chemical incompatibility between pollen-tube and style tissue which results in the bursting of the pollen-tube and the loss of the fertilizing nucleus. This seems to call for a chemical reconditioning of the stylar tissue—something much more easily talked about than done.

At last, once the pollen-tubes have accomplished their mission and the new crop of seeds is assured, there is no further need for the outer flower structures. The style withers and drops off, the flaunting corolla fades and is discarded. Down in their nursery at the base of the pistil the young seeds will grow and slowly ripen, until autumn opens the pod and the winds shake them out—to repeat the cycle another year.

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there is still some oxygen, might be reached.

Once jet speeds have broken through the wall of sound's speed, he pointed out, ram jet, the "flying stovepipe," might replace gas turbines.

"Then," he concluded, "if we are to fly higher and faster, we will depend upon rocket planes, which will break through the earth's atmosphere—100 miles up—at speeds between 3,000 and 4,000 miles an hour, which are not physiologically unreasonable."

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WILDLIFE

Lovely Trumpeter Swan Saved from Extinction

► THE TRUMPETER swan, largest migratory waterfowl of North America, has probably been saved from extinction.

Only 73 of these magnificent birds remained in the United States in 1935. Today at least 301 of these swans are to be found in this country, it was discovered through a survey conducted by the U. S. Fish and Wildlife Service, active in their restoration.

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AERONAUTICS

Jet Future for Aircraft

► JET POWER for all future American high-performance aircraft was predicted with the announcement that the Army Air Forces has given the green light to General Electric's Aircraft Gas Turbine Division to manufacture all present designs of jets and speed development of new and more powerful designs.

R. G. Standerwick, chief engineer for General Electric, forecasts that high-speed gas turbines may largely replace conventional airplane engines "in the next 10 years."

He predicted that jet engines propel-

ling commercial planes at 500 to 600 miles per hour will be forthcoming, and for the future jet-propelled aircraft may speed at 1,500 miles per hour to altitudes as high as 15 miles with engines of as great as 10,000 horsepower.

Pointing out that the speed danger zone lies between 600 and 740 miles per hour, the jet engineer declared that an intensive program is underway by government and industry to send speeds above that of sound.

Although gas turbines require oxygen to operate, Mr. Standerwick said altitudes of 60,000 to 80,000 feet, where

Do You Know?

Cellulose ethers were used as soap substitutes in Germany to save edible fats.

Poultry *mites*, unaffected by DDT, are destroyed by the British Gammexane.

Radishes, water cress, mustard, wall-flowers, stock, and mignonette are closely related.

This year's total *hosiery production* is supposed to yield 10 pairs of stockings to each woman.

Today farmers use ten times as much *nitrogen fertilizer* as they did at the beginning of the century.

Food proteins are decomposed in the human digestive tract into their constituent amino acids.

Lack of *fertilizers*, fuel and transportation facilities, also drought, caused the sharp decrease in last season's sugar output from Europe.

The highly skilled business of producing *cauliflower seed*, long considered a European secret, was mastered by American growers during the war.

A *rectifier* that changes alternating current into direct current equally well in very hot and very cold weather has been developed for use on planes and ships.



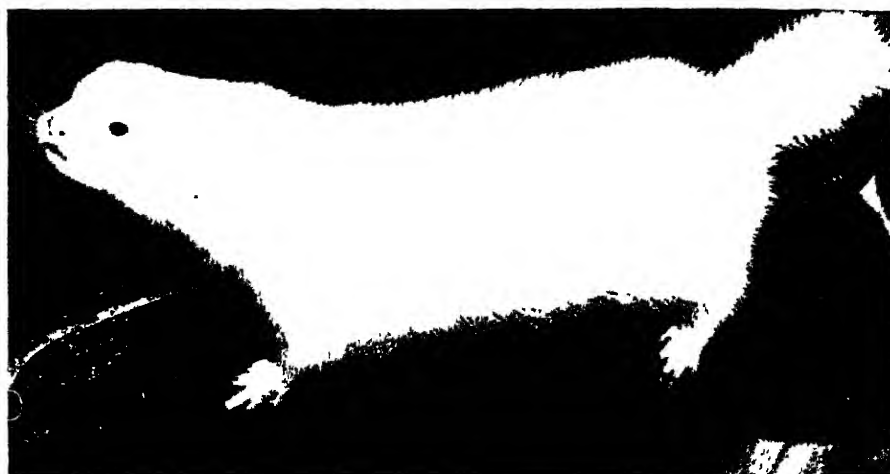
Chart I eliminates arithmetic, proportional parts, pencil and paper in interpolations in typical five-, six-, seven-place tables—logarithmic, trig, astronomical, etc. Not even adding or subtracting required. See an enlarged "picture," on a scale, of any tabular interval divided into decimal fractions or 60ths.

Chart II makes short work of precise interpolating between values which would fall on a decided curve if plotted and drawn (as in condensed tables) finds value on smooth curve connecting four nearest tabulated values. Avoids tedious graphical or trial-and-error solutions to many problems. Simplifies the construction of all tables of special functions, either theoretical or empirical.

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SNOW WHITE—The mink in the picture has natural colored eyes and "not over 12 dark hairs."

GENETICS

Mink Whiter Than Albino

➤ BREEDERS of mink have improved on nature. They are making many kinds that nature never heard of before. One is a mink whiter than any albino mink. Another is bluish in color. A third has a purplish tint.

Early breeders of mink sought to get a fur like that of the best skins of the trappers, dark in color. Today mink breeders develop animals with fur of fine texture, but of an exotic shade.

As mink began to be reared in captivity, individual freak animals appeared. Observing breeders, gifted with curiosity, bred them to their near relatives to see what kind of animal would result. Thus originated mutant varieties, mostly lighter in color than the original wild type, state Prof. W. E. Castle of the University of California at Berkeley and Larry Moore, mutation mink breeder, Suamico, Wis.

The fur of the albino mink, with its typical pink eyes, is not a clear white all over the body, as in the case of the ordinary white rabbit. Resembling the albino guinea pig, it usually has a bit of dark coloring at the tip of the tail and on the nose. Some of the original albino minks had coarse fur, but this was overcome by crossbreeding with colored mink of finer fur.

The coat of the Pastel mink, when in full prime, has a slightly purplish tint. In this fur all dark spots that would normally be black in the wild type of coat are brown instead.

Silverblu is the name adopted for one of the most valued and beautiful of the

freak varieties. It is much lighter in shade than wild mink, and both its guard hairs and underfur are bluish in color. Imperial Platinum, another mutation similar in appearance to Silverblu, is distinct in origin and follows different rules of heredity.

The fur of a type known as Koh-i-nur is practically all white, but a dark stripe runs along the middle of the back and a transverse bar of dark hair crosses the shoulders.

Descendants of the Koh-i-nur, receiving the same heredity from both parents, may have only a narrow stripe, interrupted by bits of white. Or the stripe may disappear altogether, leaving dark spots only on the head and tail.

A white variety, but with naturally-colored eyes, may be created by crossing Koh-i-nur with Blufrost, also unique for the small amount of coloring in the coat. While some of the baby mink of such parents are normally dark, about a fourth of them will have a tiny stripe down the back, or none at all, with faint spots on the head and tail only.

If such a light mink is back-crossed to a Koh-i-nur, however, some mink of the next generation will be practically all white with "not over 12 dark hairs," Prof. Castle and Mr. Moore report in the *Journal of Heredity*. When dominant whites are mated to each other, only one-third of the young mink will have the black cross marking, while two-thirds, like their parents, will have only a few stray dark hairs.

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PLANT PHYSIOLOGY

Growth without Roots

Tissue cultures have been used to produce fungi and viruses which cause diseases in plants. These studies hold high promise for crop plague fighters.

➤ FUNGI and viruses that cause disease in plants have been grown for experimental purposes on masses of plant tissue, which were themselves growing separately from the original plants, fed on a chemical solution, after the manner of the "immortal" chicken-tissue cultures made classic by the late Dr. Alexis Carrel.

This feat of plant physiology, which promises to be highly useful to fighters against crop plagues, was reported by Dr. R. J. Gautheret, eminent French plant scientist, before the Growth Symposium at Kingston, R. I. Dr. Gautheret, one of a small number of researchers in this country and abroad who pioneered the difficult business of getting

plant tissue cultures to grow indefinitely, reported to his American colleagues on work which he and his associates had carried on in France despite the wartime blackout of most research.

They have been able to produce tissue cultures of a considerable number of plants, including both fleshy tissues like carrot, endive, Jerusalem artichoke and tobacco stem, and woody stems like those of willow, grapevine and Virginia creeper. Many of the cultures are as much as six years old and have been transplanted more than 20 times.

Plant tissue cultures, Dr. Gautheret remarked, do not need to be transplanted as frequently as animal tissue cultures. He showed one that had been allowed

to grow for ten months without being divided and transplanted; it weighed more than five ounces.

These plant tissue cultures are neither stem, root nor leaf; they are "just plant." They resemble the callus that grows over healing wounds on trees, and consist of masses of almost undifferentiated cells.

In the nutrient solution which he supplied in his cultures, Dr. Gautheret included a growth-promoting substance, heteroauxin, in addition to the usual mineral salts, sugar, amino acids and vitamins. This produced rapid growth, but it also changed the appearance of the new tissue, giving it some resemblance to the abnormal growths provoked by bacteria that have been termed plant cancer. Dr. Philip R. White in this country has grown tissue cultures of plant cancers without using heteroauxin. After suggesting that these changes "may represent a sort of cancerization," Dr. Gautheret added the cautionary note: "The future will tell if this comparison is well-founded."

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INDUSTRIAL HYGIENE

No More "Mad Hatters"

➤ THE "MAD HATTER" has disappeared and there is no possibility of his reappearing in the United States, thanks to studies by industrial hygienists of the U. S. Public Health Service.

The hatter's proverbial madness, characterized by the "shakes" and mental disturbances, was due to mercury poisoning acquired on his job of hatmaking. John J. Bloomfield, assistant chief of the Industrial Hygiene Division of the federal health service, told how this hazard to workers' health was conquered when he appeared as guest of Watson Davis, director of Science Service, on *Adventures in Science*, radio program presented under the auspices of Science Service over the Columbia Broadcasting System.

Mercury was formerly used as a car-roting agent to increase the felting properties of rabbit and other skins used for felt hats, he explained. Hat makers displayed mental and physical symptoms in proportion to the amount of mercury vapor to which they were exposed in a late stage of hatmaking. The poisoning affected 8% of the fur cutters and 12½% of the hat makers.

Better ventilation and housekeeping in hat manufacturing plants were recom-

mended and installed. Then, some years later, a representative of the hatting industry came to the U. S. Public Health Service with the announcement that he had found a substitute for mercury as a car-roting agent. As a result, industry, labor unions, the federal health service and the Commissioner of Health in Connecticut, which has a large number of fur cutting and hat manufacturing plants, got together and urged all states to forbid the use of the mercury car-roting in fur cutting.

Every time a new product or device is introduced, from plastics to television, every time a new industry is developed or a change made in an industrial process, a new hazard to workers' health may be involved.

Industrial hygienists have developed the technique and the "know-how" to solve practically any problem presented to them, Mr. Bloomfield said. These health workers wish that they would be consulted when a change in industrial process or manufacture of a new product is in the planning stage, so they can advise how to avoid hazards to workers' health before the workers start on the job.

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Neglected Treasures

➤ GARDEN enthusiasts will go to all kinds of trouble to induce rare and delicate native plants to grow under their care. It is really something to be able to boast of a good clump of moccasin flowers or a bed of dogtooth violets or a veil of maiden-hair fern over a moist rockery. Maybe we value things in proportion to the trouble they cause us. In any case, there seems little inclination to cultivate some of the stout and lusty flowers of late summer and early autumn, that anybody can grow. Only a few gardens can show goldenrods and wild asters, liatris and cardinal-flower.

Fewer still have members of the horsemint group, though these are perhaps the most easily grown of all. About

all they require is to be pulled up by the roots, stuck in a hole and have dirt tramped on them. They do like good soil and reasonably abundant moisture, but like all late-summer flowers they can endure a considerable degree of drought.

Perhaps one reason why they have not been more generally accepted is the rather strong colors of their flowers. Oswego tea, otherwise known as bee balm, is about the most bumptious red-head you can find among flowers. It just doesn't match with anything. But it can be used very effectively if you have a mass of rather dark foliage that needs lighting up.

Similarly the wild bergamot is hard to fit into most orthodox garden color schemes. Its tousle-headed flowers are variously described as lilac and purple, but a closer characterization would be a blazing electric blue. Yet in the wild state, growing along roadsides or in field corners with goldenrod or wild senna or other yellow-flowered plants, it fits into the sunlit picture very harmoniously. Perhaps that would be the way to handle it in a garden: massed with yellow-flowered plants at an open vista's end.

The horsemints are true members of the mint family, all right; their leaves have something of that strong, aromatic odor that is associated with all mints. The "horse" part of the name is probably a reference to its strong, lusty growth; horses certainly do not go after them the way cats go after catnip.

This group of plants is as American as cornbread and baked beans. The only suggestion of foreignism is in their generic name, *Monarda*, which commemorates a sixteenth-century physician, Nicolas Monardes. However, Monardes was much interested in New World botany and wrote a good deal about American plants, so it is fair enough that he should have an American botanical monument in this plant name.

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YOUR HAIR AND ITS CARE

By O. L. Levin, M. D. and H. T. Behrman, M. D.

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INVENTION

Refrigerator with Two Temperatures for Homes

➤ A TWO-TEMPERATURE refrigerator, with ice-cube freezer in a compartment entirely separated from the food-cooling section, promises greater ease and efficiency in tomorrow's housekeeping. It is covered by U.S. patent 2,405,392, recently issued to Leonard W. Atchison of Schenectady, N. Y.

The freezing compartment, at the top of the cabinet, receives full benefit of the mechanical refrigeration. The food compartment below, which is to be kept at a somewhat higher temperature—40 or 45 degrees Fahrenheit—has its own cooling coil, which is filled with a mixture of oil and an easily evaporated refrigerant of the Freon type. Extensions of this coil into the upper compartment are connected with a condenser that functions as a heat exchanger. When the lower compartment tends to warm up, some of the refrigerant in its coil evaporates. The vapor rises into the heat exchanger, where it is condensed and re-cooled, flowing back into the food-cooling coil. The process is thus one of extreme simplicity and fool-proof efficiency.

Patent rights have been assigned to the General Electric Company.

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GEOPHYSICS

Sub-Surface Explosions Make Greater Havoc

➤ THE ATOM BOMB is a much more formidable weapon when exploded under water than it is when exploded in the air. This was made apparent by comparative motion pictures of Able and Baker tests shown before an audience of returned Bikini correspondents.

Much of the footage was taken by automatic cameras on towers on the atoll's islets and on ships in the target array. The rest was "shot" from planes flying as close to the scene of the explosions as the pilots dared.

Within seconds after the explosion burst violently through the lagoon's surface, a dense white mist had risen to many times masthead height and completely engulfed the ships. Charged as it was with radioactivity of deadly intensity, this mist was far worse than any poison gas used in Flanders during World War I. No protective clothing or gas mask could prevent its lethal

TEXTILES

"Azlon" Is Newest Protein Base Fiber

➤ ADD TO rayon and nylon, "azlon."

A conference called by the Federal Trade Commission has agreed that "azlon" will be the official name for protein base fibers used as a textile product in making garments.

Man-made, natural protein base fibers, or "azlon," are manufactured principally from casein of milk, soybeans and other sources of natural protein.

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radiations from penetrating the flesh and bones of anyone on the decks.

At the same time, hundred-foot waves were started, that sent deluges of green water, also radioactive, washing over the ships. These waves subsided to a tenth of their height before they had traveled three miles, but in the meantime they did their mischief. And even before they struck, the wracking shock wave had sped through the water like an earthquake, ripping hull plates open and starting even the stoutest of warships towards the bottom.

But of all the effects of this triple-threat weapon, radioactivity is by far the worst, in the opinion of Vice Adm. W. H. P. Blandy, who met the correspondents in a press conference before the showing of the films. Terming the bomb a "most insidious weapon," he pointed out that its effects might be felt not only by its immediate victims but that its "untold harm" might extend into future generations.

Adm. Blandy reiterated his wish to see the atom bomb effectively outlawed, not by mere pious words of renunciation but with a ban backed up by effective international action. If we cannot get that, he said, he is in favor of keeping the weapon and continuing research on it.

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MEDICINE

Minibunnies Used To Test Injection Fluids

► A NEW RACE of minibunnies, known as "Polish" rabbits, are proving helpful in tests for the safety of solutions to be injected into patients' veins, Dr. Carl E. Georgi, of the University of Nebraska, reported.

The salt solution frequently given patients after operations, sugar solution given as nourishment for patients unable to eat, and perhaps even blood plasma are among those which might be tested with the bunnies' aid. Full-sized rabbits are now used in testing these solutions for materials that might cause fever in the patient.

The Polish rabbits are miniature animals bred from white New Zealand rabbits, Dr. Georgi explained. Those which cannot qualify for show purposes can be obtained from dealers. These animals, slightly larger than the show animals, weigh about two and one-half to three and one-half pounds.

They take half the space usually required to keep animals for such pur-

poses and eat less, so that they can be left unattended over week-ends and holidays.

Another advantage is that less of the solution to be tested is needed, since the amount used is based on the weight of the test animal. With the usual large,

well-fed laboratory animal this often becomes such a big dose it is difficult to give. The vein in the ear, used for injecting the test solution, is satisfactory; and it is easy, Dr. Georgi said, to get accustomed to the smaller-sized ear.

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Books of the Week

AIR AFFAIRS: An International Quarterly Journal—*Air Affairs, Inc.*, 130 p., subscription \$5. per year. Vol. I, No. I.

APPLE QUALITY AND ITS EFFECT ON PRICE AND RATE OF SALE—G. E. Blanch—*Cornell University Agricultural Experiment Station*, 50 p., tables, paper, 5 cents Bulletin 826.

APPLE-TREE PRUNING WOUNDS: Treatment and Healing in Sound and Winter-Injured Trees—D. S. Welch and L. H. MacDaniels—*Cornell University Agricultural Experiment Station*, 23 p., illus., paper, 5 cents. Bulletin 821.

FIRST DENVER CONGRESS ON AIR EDUCATION: Held at Denver, Colo., July 23 to 28, 1945. *University of Denver Press*, 139 p., \$2.50.

FROM THE RESEARCH LABORATORY TO THE ARMED FORCES—*Mellon Institute of Industrial Research*, 32 p., paper, free. Talks by specialists in wartime research on medicine, synthetic rubber, radio, etc.

INVENTING FOR PROFIT. Louis Chayka—*Humphries*, 205 p., \$2.50. This book is a fascinating revelation of those people who anxiously try their skill on improving all kinds of ideas. The chapters discuss the patent system, the requirements of the Patent Office, the ways to exploit inventions, and many allied subjects.

OFF TO A GOOD START: A Handbook for Modern Parents—Irma S. Black—*Harcourt*, 256 p., \$2.50. A nontechnical book about the day-to-day problems which confront the parents of small children.

PLANNING PROGRAMS FOR VETERANS IN RURAL AREAS: Edwin R. Hoskins—*Cornell University Agricultural Experiment Station*, 57 p., tables, paper, 10 cents. Bulletin 825.

PRINCIPLES OF DYNAMIC PSYCHIATRY—Jules H. Masserman, M.D.—*Saunders*, 322 p., illus., \$4. The book presents the fundamentals of dynamic psychology and clinical psychiatry briefly, clearly and systematically, and so prepares the student for clinical training in diagnoses and therapy through direct work with patients.

RESULTS TO DATE OF STUDIES OF THE DURABILITY OF NATIVE WOODS TREATED AND UNTREATED—C. N. Whitney—*Dept. of Agric., Northern Rocky Mountain Forest and Range Experiment Station*, 54 p., tables, paper, free. Station Paper No. 5.

SCIENTIFIC INSTRUMENTS—Herbert J. Cooper, ed.—*Chemical Publishing Co., Inc.*, 305 p., illus., \$6. A discussion of a wide range of instruments designed for making physical measurements. Not only laboratory instruments but also those used in the field, in industry and commerce are covered.

THE SPECIES OF PLATYCOPIA SARS (COPEPODA CALANOIDA)—Mildred Stratton Wilson—*Smithsonian Institution*, 16 p.,

illus., paper, 15 cents Smithsonian Miscellaneous Collections, Vol 106, No. 9.

THE STORY OF THE THERMOMETER—Benjamin De Leon—*Science Learning Aids Pub. Co.*, 32 p., tables and illus., paper, 35 cents. Lessons in Science Series for School and Home Study No. I. A booklet suitable for the 9th grade science student, giving a picture of the kind of relationship that exists between the subject matter and those men who have developed it.

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RESOURCES

Rich Cattle Land Found in Colombia

► NATURE, assisted slightly by man in modern times, is creating in the interior of Colombia, S. A., a rich grassland comparable to the American great plains or the Argentine pampas, says Dr. R. A. Stirton, University of California paleontologist.

Dr. Stirton says that this area, called the llanos, Spanish for "great plain," covers more than half of Colombia, and is still expanding. The paleontologist has just returned from making a geological study of the eastern flank of the Andes along the edge of this great plain.

He says that evidently there is now under way a gradual geological uplifting of the llanos area; at the same time the inhabitants of the area are constantly burning off the grass on the plain, which also burns part of the bordering jungle. Dr. Stirton says these two factors help expand the plain.

The area awaits only transportation facilities, such as highways and railroads, for its development as a rich cattle range. Dr. Stirton reports the soil appears to be good, and, though the area is just north of the equator, the climate along the Andean foothills is excellent.

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Cotton's importance in American economy is indicated by the employment it provides; in 1939, about one-quarter of the total farm population of the United States grew cotton, and 500,000 persons worked in cotton textile making.

•New Machines And Gadgets•

❁ **DEFROSTER** for household refrigerators removes ice from the outside of the cooling unit without heating up the entire inside of the refrigerator. The device consists of a number of metallic plates overlying the walls of the cooling unit, with electrically insulated heating elements behind them.

Science News Letter, September 7, 1946

❁ **LIGHTWEIGHT** cylinder for portable fire extinguishers using compressed carbon dioxide weighs slightly more than half as much as the older cylinder and holds 25% more of the extinguisher. Its light weight and trigger control valve make it easy to handle.

Science News Letter, September 7, 1946

❁ **DETONATION** indicator, designed for use on all types of engines and aircraft, gives positive warning of improper combustion by detecting and evaluating detonation. It is a tiny device, an improvement on former indicators, easily installed, timed and maintained.

Science News Letter, September 7, 1946

❁ **HEAT-RETAINER** and holder for a nursing bottle keeps liquids at a proper temperature and inclines the bottle at the proper angle for feeding. The cylindrical insulated container, into which the bottle fits, has its open end covered, when in use, by a breast cap through which the nipple projects.

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❁ **VEGETATION** killer used 12,000 volts of electricity from a portable generator to electrocute weeds and deep-rooted perennials, without harming



row-crops or the soil. The wires shown in the picture are copper electrodes for discharges at the base of foliage.

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❁ **ADJUSTABLE** frame for photographs, by a system of springs and overlapping corners, can be pulled out or pushed in to suit any size of pictures from four by six to eight by ten inches. The frame, made of a plastic by an injection molding process, is of different colors.

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❁ **JET-POWERED** speedboat, in England, will have a modified form of a jet engine such as is used in aircraft. Two will be installed in the same hull

that, powered with conventional aircraft engine skimmed over a water course at a rate of nearly 142 miles an hour.

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❁ **POT CLEANER** is designed to replace steel wool, that is held with the fingers. Built on the principle of an egg-beater, different types of brushes can be attached.

Science News Letter, September 7, 1946

❁ **ODOR REMOVER**, to pick up offensive smells emanating under bed covers from a patient's infected wounds, consists of a perforated canister containing activated carbon, placed close to the odor source. An electric fan draws the odor-laden air through the carbon, delivering purified air into the room.

Science News Letter, September 7, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 327. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

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SCIENCE NEWS LETTER

1719 N St., N.W., Washington 6, D. C.

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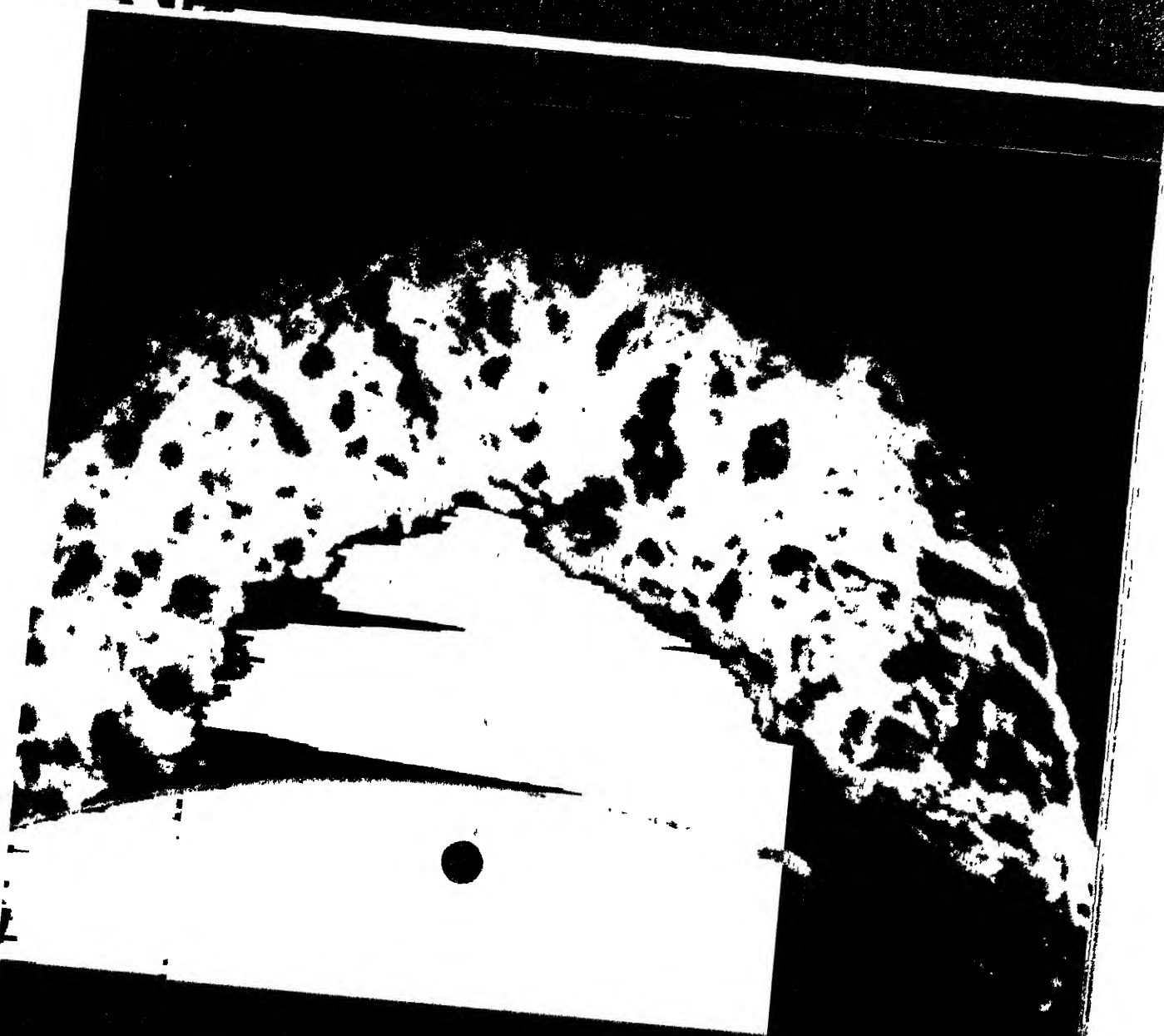
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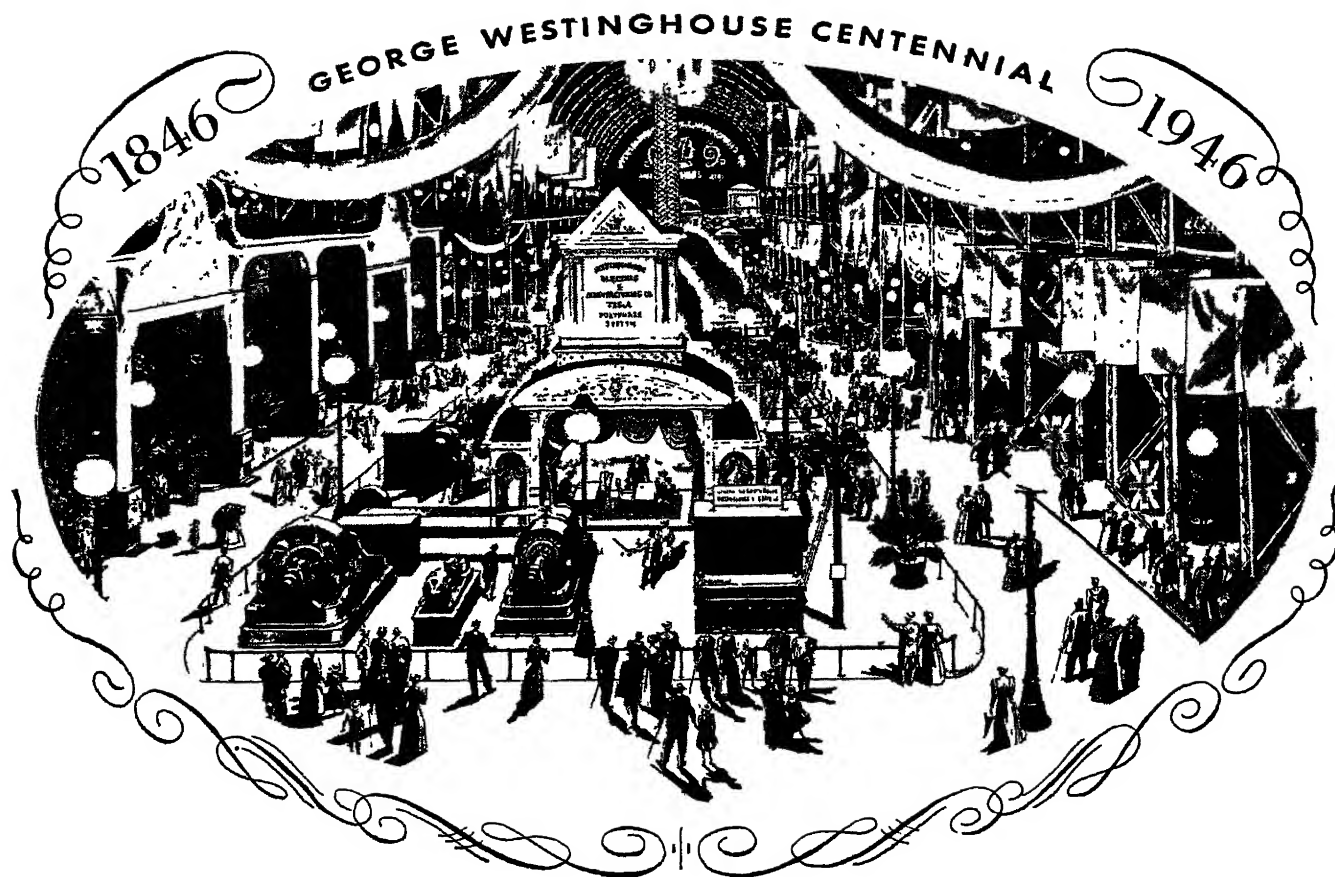
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The Dawn of Electric Power

The modern age of electricity was born in 1893, when George Westinghouse demonstrated the *first integrated a-c system* at the Chicago World's Fair.

Some years earlier, in 1886, Westinghouse had proved the *practicability* of transmitting alternating current *over a distance* . . . at Great Barrington, Massachusetts.

However, a critical problem had yet to be solved before electricity could become the universal servant of mankind. The first step—sending alternating current over considerable distances—immediately spotlighted the need for the next step . . . devising a means to utilize a-c current as an economical power source at the point of use.

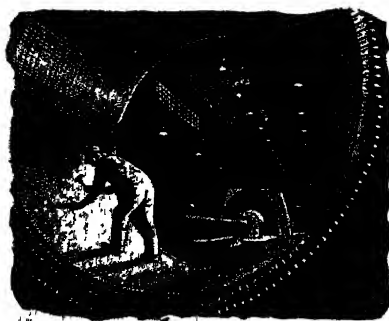
George Westinghouse tackled this problem with characteristic energy. With the help of Nikola Tesla, he devel-

oped the *induction motor*—the only practical power source for driving machinery by alternating current.

But the induction motor solved only part of the problem. For efficient operation, Westinghouse soon found it necessary to *redesign completely* the crude a-c system of that day . . . to perfect a *polyphase generator* and to establish our present frequency standard of 60 cycles a second.

Culminating these efforts, Westinghouse built and installed induction motors, transformers, a polyphase generator and a completely integrated a-c transmission system—in a sensational exhibit at the Chicago World's Fair!

It was the *dawn of electric power* . . . the forerunner of electrical equipment that is today serving mankind—in industry, in our homes and on our farms.



Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE

TODAY... The Westinghouse Electric Corporation makes hundreds of types of electric motors for thousands of uses. They range in size from tiny, fractional hp motors to the mammoth 40,000 hp unit that powers the 400-mile-an-hour wind tunnel at Wright Field . . . *the largest rotor-wound induction motor ever built.*

Tune in: TED MALONE—Monday, Wednesday, Friday, 11:45 am, EDT, American Network

CHEMISTRY

ACS Reports Marvels

Chemists tell of research that resulted in the "discovery" of fluorine during the war, the speeding up of penicillin production and the dehydration of garbage.

➤ A NEW CHEMICAL element, not one of the excessively rare fissionable metals of atomic bomb fame, but a light non-metal, as common as carbon, nitrogen or chlorine, has in effect been discovered during the war years and is the subject of a number of papers given at the meeting of the American Chemical Society in Chicago. The element is fluorine, actually known as a curiosity for nearly 200 years, but so corrosive, dangerous and difficult to handle that until now chemists have let it alone as much as possible.

Separation of the uranium isotopes was accomplished by using uranium fluoride, the only gaseous compound of that heavy metal. For its production, quantities of the element fluorine had to be made and stored ready for use. Since the only common use for fluorine up to that time, the etching of glass, depends upon fluorine's ability to eat glass and make it disappear in the form of a gas, the first problem was to find materials which would make satisfactory containers for this extremely active element.

Carbon Steel Containers

Chemists from university laboratories and industrial plants who took part in the cooperative researches which solved the most immediate problems on handling fluorine on a large scale reported to the American Chemical Society meeting that tanks and pipes of carbon steel were found practical, with electrodes of carbon to lead the electric current into the solution from which the fluorine is to be extracted and nickel electrodes at the poles where the corrosive gas is drawn off. The employment of modern automatic gas-handling machinery using high pressures and low temperatures, sometimes as low as that of liquid nitrogen, made possible the production of this new chemical. One of the subjects of research had to be methods for disposal of waste fluorine.

Out of the new interest in this active element have come new lubricants for airplanes and automobiles which are

much less sensitive to temperature changes than the natural oils and greases formerly available. Many other new compounds are available whose properties will fit them for uses not satisfactorily filled by present-day materials. To the chemist, these offer an exciting field for new experiment, for they nearly double the already enormous array of compounds, both organic and inorganic, with which he works.

To the chemist, fluorine belongs to the family of halogens, or salt-formers. Other members of the family are chlorine, familiar as antiseptic and bleach; bromine, now mined from sea-water for use in making anti-knock compounds for gasoline; and iodine, heaviest and most metallic of the group, which is dissolved in alcohol to make the familiar antiseptic tincture. Besides etching glass, fluorine commonly appears as sodium fluoride, a household insecticide.

Penicillin Production

Penicillin production by molds can be speeded in essentially the same way shipbuilding by men was speeded during the war—the subassembly method. Subassembly in shipbuilding meant bringing to the shipyard a whole bow, a whole stern, a whole cabin, already put together elsewhere and letting the workers weld them into place. Subassembly in penicillin production means putting into the molds' culture solution chemical compounds containing groups of atoms already arranged in patterns known to exist in penicillin.

Success with this method was reported before the meeting of the American Chemical Society by Dr. F. G. Jarvis and Dr. M. J. Johnson of the University of Wisconsin. They were able to increase the production of penicillin G by adding phenylacetic acid, which contains a ring of atoms characteristic of this particular penicillin variety. For a different penicillin, designated as X, the best subassembly molecule was that of p-hydroxyphenylacetic acid.

Two other University of Wisconsin scientists, Dr. Kiyoshi Higuchi and Dr.

W. H. Peterson, reported on a bacterial assay for the various kinds of penicillin. Three bacterial species respond differently to each of three different penicillins, so that their behavior in the presence of a mixture of penicillin "unknowns" gives an index to what is in it.

Coming Up: Dehydrated Garbage

Dehydrated foods we all heard plenty about during the war. New, however, is the idea of dehydrated garbage, presented before the chemists by Dr. W. A. Bush of the California Flaxseed Products Company of Los Angeles.

After the 82% or so of water is removed, the speaker stated, the remaining dry matter contains materials that can be used to advantage as fertilizers. And if the garbage can be collected in sufficiently fresh condition, as would be the case at hotels, hospitals, etc., it can be made to yield greases suitable for soap-making and other technical uses,



AAF photograph

MAN-MADE ANTENNA—The Army Air Forces uses radar antenna such as this to measure the height of thunderstorms. This antenna rocks back and forth, recording on a scope the echoes returned by the thunderstorm and giving valuable data on the storm's structure. Part of the equipment is being used in the joint AAF-Navy-Weather Bureau at Orlando, Fla.

and a meal suitable for livestock feeding produced from the residue.

Soil Chemistry

Botanists can give chemists some useful pointers when it comes to finding out what's wrong with a given area of soil, Prof. Walter S. Eisenmenger of Massachusetts State College indicated in an address before the meeting. A man with a well-trained eye for plants can tell, by the presence or absence of certain species, a good deal about the chemical state of affairs down at root level.

In general, wild plants are more sensitive indicators of soil chemistry than cultivated plants, Prof. Eisenmenger stated, and he attributed this to the long cen-

turies since he first tamed them. Among the wild plants, the species farthest down on the ladder of evolution are the most responsive.

Fissionable Matter

A preview of what plenty of fissionable materials can do towards revolutionizing everyday life was provided by a paper presented at the meeting by Dr. C. L. Comar and Dr. George K. Davis of the University of Florida. They demonstrated by means of "tagged" atoms of artificially radioactive cobalt that this element, needed in minute amounts to keep animals healthy, must be supplied to cattle constantly because they have no way of storing reserve supplies of it in their bodies.

The cobalt used in these experiments

was made radioactive in a cyclotron, but larger supplies at much lower cost should soon be made available as the country's U235 and plutonium production facilities become available for turning out radioactive elements for scientific research purposes. Not only the relatively minor element cobalt but also such elements as phosphorus, calcium, potassium and sodium, all of major importance in animal and plant physiology, should soon be available cheaply and in quantity for use in experiments designed to answer old riddles in life processes, and to make the answers significant in increased food production and better health.

Science News Letter, September 14, 1946

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INVENTION

Optical Canes to Aid Blind

► A BLIND MAN, using a seeing-eye optical cane, may soon be as familiar a sight on crowded city sidewalks as the uncertain tapping of a blind man's stick or the gentle tugging of a seeing-eye dog.

An experimental sensory aid for the blind that uses a beam of light to accurately detect the distance and direction of all obstacles within 20 feet is being perfected by the Signal Corps Engineering Laboratories, Bradley Beach, N. J. It cannot be called radar, but it is like radar in which visible light is used instead of short radio waves.

The size of a loaf of bread, a nine-pound case carried in one hand is connected by a short wire to a single earphone. Trees, people, steps, and other obstacles in the path of the blind user are heard, instead of seen, as coded "dots" and "dashes".

In scanning his surroundings, the blind person turns the case slowly from side to side so that the beam of light projected from the front of the case can reflect any obstacle it meets. The reflected beam of light is changed by a photoelectric cell into coded tone signals in the blind user's earphone.

With a little practice a person could easily determine the exact distance, to within one foot, of obstacles on a city street or in a room strewn with furniture. His sense of hearing allows him to learn to recognize the code signals. While a reflection from an object 11

feet distant produces a tone signal of one "dash", and a reflection from eight feet distant produces a signal of two "dots", a reflection from an object 10 feet distant produces a strong "dash" and two weaker "dots", and a reflection from nine feet produces a weak "dash" and two stronger "dots". The time of travel of the reflected light determines the sound code.

Although the Signal Corps is already producing a few test models for continued experiments, optical canes for the blind cannot be produced commercially until the present apparatus is perfected.

As yet, the device would be of little help to a blind person in crossing streets, since a speeding vehicle would not be detected until it was within 20 feet of him. Before the seeing-eye device is introduced to the public, it will be made lighter and equipped to detect small objects, such as narrow posts and hanging wires.

The problem of filtering out signals from sunlight and ordinary electric light used for illumination has been solved by making the optical cane sensitive only to pulsed light, and then pulsing the beam of light emitted by the case to that exact frequency.

Research is continuing under the direction of Lawrence Cranberg, a civilian Army physicist, who designed the first model.

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MEDICINE

AAF Devices Fight Polio

New development is useful only for bulbar infantile paralysis that affects breathing. Only a few such cases usually occur in an epidemic.

► THE LATEST development in polio fighting, although apparently life-saving in some cases, will prove disappointing to many anxious parents whose hopes may have been raised by reports of "the greatest single advance in 50 years in the fight against polio."

It does not answer all the problems in polio, according to authorities at the National Foundation for Infantile Paralysis. It is useful only for cases of bulbar infantile paralysis. These are the ones in which the respiratory or breathing center in the brain is affected and they often end fatally. The number of bulbar cases in any epidemic, however, is usually small.

The new development consists in use of Army Air Force equipment developed to protect men against oxygen lack at high altitudes and to give artificial respiration in the cramped space of a plane where ordinary methods were impractical if not impossible.

Although optimistic about the new development in polio fighting, Dr. M. B. Visscher, of the University of Minnesota, where it was first tried, said that he and his group are not yet ready to make any statement about results and have not made any statement. Physicians who are very happy with the results have made some comments.

The National Foundation for Infantile Paralysis authorities stated the new development has been used so far in 20 patients. All but one survived. Four or five would have been expected to die at the usual 20% to 25% fatality rate in bulbar polio. The only death was in a patient whose parents refused permission for the new treatment until too late.

A tiny light that clips on the ear lobe is one of the new weapons being used against polio. This device with filters measures the amount of oxygen circulating in the blood. It was invented for the AAF by Dr. Glenn Millikan of the University of Pennsylvania. With a recording tape it gives a continuous measure of oxygen level in the blood and was used, among other times, to show AAF trainees going through the altitude chambers the need for wearing

oxygen masks at high altitudes. The device is painless and does not require taking even a drop of blood from the patient.

With this device doctors can tell immediately when the patient is even slightly lacking in oxygen, instead of having to wait for clinical symptoms such as cyanosis, or blueness of lips and skin, by which time the patient's oxygen need is very great and his condition poor.

When oxygen is needed, the University of Minnesota doctors make use of another AAF device, kept very "hush-hush" during the war, called the pneumatic balance resuscitator, to supply oxygen at the rate needed.

Earlier than usual use of tracheotomy is said by National Foundation authorities to be another feature of the Minnesota treatment. This operation consists in cutting a hole into the patient's trachea and inserting a tube for breathing. When a patient with bulbar polio loses his swallowing reflex, he is in danger of choking on the mucus accumulating in the larynx above the trachea. The operation removes this danger.

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INVENTION

Fire-Resistant Cloth Is Also Water-Proof

► FABRIC that is at once fire-resistant and water-repellent can be made by a process on which U. S. patent 2,406,779 has been granted to John L. Kurlychek of Orange, N. J.

Fire-resistant clothing has long been made of woven asbestos, but most of this is thick, clumsy and not water-proof. Lighter asbestos cloth can be made by mixing about one-fourth cotton into the fiber; but this cotton remains inflammable. Mr. Kurlychek's solution is to impregnate the cotton with a metallic compound that renders it flame-resistant and at the same time makes it able to shed water.

The compounds favored by the in-

ventor are soaps of the heavy metals, for example zinc. These are insoluble chemical relatives of ordinary washing soaps, except that the latter contain lighter metals, usually sodium, and of course are soluble in water. The fabric is first soaked in a chemical solution of the heavy-metal soap, the solvent is wrung out, and the fabric then mildly heated to melt the soap into its fibers. Fabrics thus treated can be repeatedly dry-cleaned without losing their dual resistant properties.

Patent rights are assigned to the United States Rubber Company.

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EDUCATION

Better Science If Teachers Better Paid

► CHARGING that there is more financial incentive for a young man to seek to be a milkman or janitor than a high school science teacher, Dr. Paul E. Klopsteg, chairman of the American Institute of Physics, declares that American youth cannot be properly educated for an atomic age until teachers are paid higher salaries.

"Teachers' salaries have advanced little in recent years, while incomes in other occupations have risen by leaps and bounds," he said, adding, "The discrepancy between teachers' salaries and incomes in other occupations is much wider in the United States than in other countries."

"We cannot hope to retain or advance our scientific superiority in the dawning atomic age unless this weakness in our society is overcome," Dr. Klopsteg warned.

He reported surveys showing that the average teacher salary is about \$1,500 a year, and most high school teachers receive less than \$2,000.

"Many milk deliverers receive more than twice as much in wages and commissions," the educator pointed out.

Predicting a critical shortage of both scientists and science teachers for many years, Dr. Klopsteg said that improved high school science training is needed both to interest young people in science and to acquaint all students with science as a basis for good citizenship in the modern world.

Urging higher teaching standards, he concluded, "Better teaching requires higher salaries."

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RADIO

From Milky Way to Earth

Radio signals may have originated in the gas and dust between the stars of the Milky Way, radio survey of the universe reveals.

➤ RADIO signals which have been on their way to us for hundreds and thousands of years may have originated in the clouds of gas and dust that fill much of the spaces between the multitude of stars in the Milky Way, Grote Reber of Wheaton, Ill., told members of the American Astronomical Society meeting in Madison, Wis.

A sheet-metal mirror 31.4 feet in diameter and 20 feet in focal length was the chief apparatus used by Mr. Reber in his radio survey of the universe. This mirror focuses the long-wave radio radiation which it collects from a systematic scanning of the sky. Radio waves originating outside the earth, called "cosmic static," were discovered about 15 years ago by K. G. Jansky of the Bell Telephone Laboratories.

In the radio receiver the cosmic static appears as a hissing sound similar to the boiling of a teakettle. At 160 megacycles the sound is definitely very strong in the direction of the Milky Way. The eccentric position of the sun in the Milky Way galaxy, near the edge in the constellation of Perseus, is confirmed by the weakness of the cosmic static in that direction as compared with its greatest strength in the direction of Sagittarius, toward the center of the Milky Way.

The sun, too, gives off radio radiation, and it is easy to predict how strong it should be at our distance away from the sun. Mr. Reber stated that the observed "static" from the sun agreed well with that theoretically predicted. The other stars in the Milky Way must give off radio radiation too, but their tremendous distances weaken it so much that it is only sufficient to account for an insignificant part of the observed "cosmic static." There must be some other origin for this strong radio energy coming from the direction of the Milky Way, and Mr. Reber proposes that it originates in the depths between the multitude of stars.

Toward the center of the Milky Way, in Sagittarius, clouds of obscuring matter are very prominent, and these same interstellar clouds causes lanes and rifts to be apparent in many other regions

of the Milky Way, especially in the directions of Cygnus, Cassiopeia, Canis Major and Puppis, where secondary maxima in cosmic-static intensity have been found by the Wheaton scientist. He proposes that the mechanism for producing these radio impulses is what physicists call free-free transitions of energy.

Free-free transitions result when one particle of matter, most probably an electron which has escaped from an atom, passes another atom and loses some of its energy but is not captured. The electron may pass the nucleus of a hydrogen atom, slow it down a bit or change its direction, and the energy lost will be radiated into space as a pulse of radio energy. These free-free transitions, in the low density of interstellar gas, may be of rather low energy, so the radiation would appear appropriately as long-wave radio energy rather than as the comparatively short waves of light.

The intensity of cosmic static, as

BACTERIOLOGY

New Antibiotic Source Is Dead Forest Litter

➤ NEWEST source of antibiotics, or penicillin-like substances, is forest litter, the mass of dead and decaying leaves that lie under the trees. Discovery of several antibiotic compounds in litter composed of leaves of maple, birch, beech, ash, poplar, oak and elm is reported by Dr. Elias Melin and Dr. Torsten Wiken of the University of Upsala.

Although apparently formed by mold action, these substances are most effective in checking the growth of molds, especially of soil fungi. One, however, which was extracted from dead maple leaves, proved effective against *Staphylococcus aureus*, the yellow pus germ of common boils.

Details of the work of the two Swedish botanists are given in the British scientific journal, *Nature* (Aug. 19).

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measured by Mr. Reber's apparatus, is quite high for the frequencies used by long-distance short-wave commercial stations, somewhat weaker at frequencies used by FM broadcasting and television stations, faint at the lower radar frequencies, and below perception on the best equipment designed for the higher radar frequencies. Therefore, such apparatus as was used to bounce a radar beam off the moon cannot be used to study cosmic static.

It is proposed that a station similar to that at Wheaton be established in a low latitude to enable observations of the portions of the Southern Milky Way invisible at Wheaton—areas in which lie some of the most dense regions of both stars and interstellar clouds. Also, Mr. Reber proposes that conditions in the tail of a comet may resemble, from a radio standpoint, those in an interstellar cloud, so that were a bright comet with a large tail to pass our way an excellent opportunity would be provided to make closehand observations and to verify his theory.

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ASTRONOMY

Gigantic Prism Is En Route to Telescope

➤ A 300-POUND glass telescope prism, the biggest ever made, was completed in Connecticut for installation in the world's largest Schmidt-type telescope at the Observatorio Astrofisico Nacional, in Mexico. It will be used for auxiliary equipment to photograph stellar spectra more than 100,000 times fainter than the faintest star visible to the naked eye.

The prism was ground and polished by the Perkin-Elmer Corp., at Glenbrook, Conn., from a 379-pound optical glass molded at the Bausch and Lomb Optical Company of Rochester, N. Y. The new prism exceeds by three inches the next largest one of its kind. This is in the Schmidt-type telescope at the observatory of the Case School of Applied Science in Cleveland, Ohio.

Without such an objective prism, a star image is but a dot. With the prism, each dot becomes a thread-like spectrum. This spectrum may be observed through a view telescope, or recorded on a photographic plate for future study. From the spectrum lines, scientists are able to ascertain the elements in the atmosphere of a star, its degree of ionization and its surface temperature.

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PUBLIC HEALTH

Senate Group Aids Health

Report of subcommittee tells about attempts to cut the nation's \$8,000,000,000 annual sickness and accident bill.

► HOW A SENATE subcommittee labored for three years to improve national health and cut the nation's more than \$8,000,000,000 annual sickness and accident bill is revealed in a report by Sen. Claude Pepper, of Florida, chairman of the subcommittee on health and education.

Working with him on the subcommittee were the following Senators: Elbert D. Thomas, Utah; James E. Murray, Mont.; Lister Hill, Ala.; James M. Tunnell, Del.; Robert A. Taft, Ohio; George D. Aiken, Vt.; H. Alexander Smith, N. J.; and Wayne Morse, Ore.

If you are a white collar worker and had your salary raised to meet increased costs of living in 1944 or 1945, you have this committee, in part, to thank for it. As a result of a special hearing to investigate the health and economic problems of Americans with fixed incomes resulting from the wartime increased cost of living, the subcommittee recommended that the War Labor Board cease applying the Little Steel formula to substandard salaries and wages.

"Hundreds of local governmental units and the Federal Government as well followed by granting cost-of-living wage and salary increases to their employees, as recommended by the subcommittee," Sen. Pepper reports.

If your child stopped running the streets, playing truant and pilfering from neighborhood stores because he was finding fun in a new teen-age club where there was wholesome amusement after school, or if you were able to get aid from a child guidance clinic, you may have the subcommittee to thank. Various of its recommendations on juvenile delinquency, based on hearings, were carried out in local communities by health, child welfare and educational authorities.

You or some member of your family may in future be helped to escape mental illness or to recover from it more rapidly, partly through activities of this subcommittee. Passage of the Mental Health Act to speed research, training and facilities for the control of mental illness followed hearings and a report by the subcommittee.

Among results from other investigations of the subcommittee and its staff, Sen. Pepper lists the following

Closer collaboration at the community level of various federal agencies through the work of the President's Committee on Congested Areas and expansion of public health work in such areas was effected.

The American people learned the full and shocking truth about the inadequacies of our medical care system and about our generally low level of health compared to what we can achieve.

The need for a broad national program of medical research was revealed.

The subcommittee recommendations for nation-wide expansion and coordination of hospital and health center construction resulted in the passage of the

FORESTRY

Lumber Shortage Is Bad

► PRESENT lumber shortages, a key factor in the nation's housing plans, may get worse rather than better, the Forest Service of the U. S. Department of Agriculture warns. The reason: we are not growing enough trees.

Estimating that the U. S. will need 42,000,000,000 board feet of lumber a year for the next 10 years, the Forest Service declares that "it will be difficult" to push lumber output above 33,000,000,000 board feet each year.

"Meanwhile," the Forest Service predicts, "the average farm or home owner is going to have difficulty getting all the timber he would like to have."

Some wastes can be avoided by better cutting, marketing and milling practices, while protection against fire and pest losses may help some, it was reported.

"But in the long run, we shall have to grow more timber than we do now if we are to supply the needs of a prosperous nation," Service officials said.

Painting a bleak picture of the nation's lumber prospects, the Forest Service reported the regional lumber supply situation as follows:

West: Many established sawmills will run out of logs in a few years. New

Hospital Construction Act of 1946.

Specific reforms recommended in the subcommittee's report on veterans' health problems were put into effect by General Bradley, the Administrator of Veterans' Affairs.

It aided in the passage by the Senate of a resolution to establish an International Health Organization, an indirect result of which was the formation of a tentative international health organization within the framework of the United Nations.

Disclosure of the pressing problem of ill health of mothers during maternity and of children brought about an increase in the appropriation for maternal and child health and welfare under the Social Security Act.

The American people were informed of the inadequacy of voluntary health insurance plans in meeting the national health problem and of national compulsory health insurance as the most economical and efficient way to assure high quality medical care for all our people.

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opportunities for large-scale operations are limited.

North: Timber depletion has shrunk the lumber industry to a small fraction of its former importance.

South: The stand of fast-growing pines is not sufficient to maintain present output.

East: The whole eastern half of the country now has only about as much lumber as the 6% of the forest area in the Douglas fir region of Washington and Oregon.

During the war the U. S. used more timber than was produced, and the nation is still cutting and burning wood faster than trees grow, point out the forest officials.

With a reserve of only 4,000,000,000 board feet of lumber compared with pre-war stockpiles of 17,000,000,000, the situation is increasingly critical because of the greater postwar demand.

To achieve an adequate timber supply, the Forest Service proposes a three-point program: 1, public regulation of the forests; 2, public aid to forest owners; and 3, more public forests.

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PHYSICS

Gallium Thermometers Give Direct Readings

➤ GALLIUM thermometers that gave direct readings of temperatures up to 1,200 degrees Centigrade have been discovered in Germany by British scientific investigators. The gallium thermometers showed temperatures which otherwise would have been measured by thermocouples, disappearing filament pyrometers or other indirect means.

Gallium, generally found as an impurity in zinc blends, melts at 30 degrees Centigrade, but it is not very volatile in red heat.

One of the German gallium thermometers was found in the furnace bath of an aluminum reduction plant and another was used in a coke calcining retort. The gallium thermometers consist of a quartz capillary inside a quartz envelope. The capillary contains pure gallium with a slight trace of iron.

A technical report on the thermometers is now available to American scientists

Science News Letter, September 14, 1946

CHEMISTRY

Insects Meet Death In Operation "BUGS"

➤ SUCCESS in the Navy's wartime fight to produce a better weapon against malaria-carrying mosquitoes brings to the world a chemical that both kills and repels mosquitoes and other "bugs" and promises better living in peacetime.

The story of "Operation BUGS" was told by Lieut. Comdr. Michel Pijoan when he appeared as guest of Watson Davis, director of Science Service, in *Adventures in Science*, radio program presented under the auspices of Science Service over the Columbia Broadcasting System.

The new chemical, officially known as NMRI 448, was developed by Lieut. Comdr. Pijoan and Lieut. L. A. Jakowski at the Naval Medical Research Institute at Bethesda, Md. It gets its name from the initials of the Institute and the fact that it was the 448th of many compounds developed by the Institute. In their development theory and chemical structural changes were closely followed with reference to repellent action, Lieut. Comdr. Pijoan said.

The new anti-bug weapon both kills and repels insects. The killing feature is important for ridding an area of insects.

The repellent feature gives personal and animal protection.

In the search for a repellent, the Navy scientists had to find a chemical that was powerful, safe and easy to use. It had to be something a man could use himself, cosmetically acceptable and not injure him. In addition it had to be something that would not dissolve in water so that it could not be easily washed off by tropical rains and sweat.

In 448 they found what they were looking for. In the tropics a single application repelled mosquitoes, chiggers, sand flies and bedbugs for a long time. It is effective anywhere from 5 to 13 hours. How effective it will be in temperate climates and for repelling insects from a house or barn is now being investigated

Science News Letter, September 14, 1946

CHEMISTRY

Paper Mill Waste May Make Yeast

➤ PLANS to use waste sulfite liquor from paper mills in the production of yeast are being developed in Wisconsin. If successful, this program will not only bring added revenue to mills amounting to millions of dollars, but will also do much to eliminate stream pollution in the paper mill areas.

A total of 12 companies, 11 of them Wisconsin paper firms, have organized the Sulphite Paper Manufacturers Committee on Waste Disposal, and are co-operating with the Institute of Paper Chemistry at Appleton, Wis., in research on this subject. A chemist has been sent to Germany to study plants there.

A process has been developed which allows yeast from sulfite liquor to be used for animal feeds, principally poultry at this time, although feeds for cattle are also likely. There is a possibility that foods good for human consumption may be reclaimed from the waste.

The yeast process uses the wood sugars in sulfite pulping liquors, and further research may, it is hoped, find uses for the lignin solution remaining after the sulfite is drawn off. A site is now being sought for an initial reclamation plant for the research.

The Marathon Corporation, one of the cooperating group, is already reclaiming a number of by-products from these wastes, including water softeners, chemicals for aiding concrete mixing, plastics and vanillin.

Science News Letter, September 14, 1946

IN SCIENCE

FOOD TECHNOLOGY

Eggs Keep Better In Cool Weather

➤ EGGS will keep better in your refrigerator if they have been kept cool from the time they were laid. From nest to kitchen stove, heat and not humidity threatens egg quality. Since heat aids the growth of bacteria on the shells, a few degrees may make a difference in bacterial growth between Grade A eggs and cheaper ones.

Cover the egg basket with moist burlap to keep eggs cooler. This farm trick is recommended by the poultry specialists of the United States Department of Agriculture. The evaporating moisture leaves eggs cooler, just as evaporating sweat from the farmer's brow leaves him cooler

Science News Letter, September 14, 1946

NUTRITION

Milking Machine for Guinea Pig Aids Research

➤ SCIENTISTS are after the poor guinea pig again—this time with a milking machine. The machine, smallest milker in the world, is mounted on a board 18 x 6 inches, and Prof. B. L. Herrington, dairy researcher at Cornell University, expects milking guinea pigs to be valuable to nutrition studies.

Milking guinea pigs is a two-man operation, with one person holding the animal, and it takes about 10 minutes. The record milk yield so far is 7.8 grams, or about one-fourth of a fluid ounce, from one guinea pig.

Rats, rabbits and possibly hamsters, a rat-like rodent, may all be milked with the midget milker, using slight adjustments, Prof. Herrington said.

Seeking an experimental animal with a nutrition system and milk with a lactose content all similar to that of humans, the Cornell scientists hit on milking the small laboratory animals.

After the guinea pigs are milked, chemical analyses are made of the milk for lactose, protein, ash content and vitamins. Particular emphasis is being placed on the lactose, important in the manufacture of penicillin.

Science News Letter, September 14, 1946

E FIELDS

SEISMOLOGY

New Map Reveals Earth's Structure Below Surface

➤ A NEW underground map of the Caribbean area revealing the structure of the earth down to 500 miles below the surface may come from studying the seismograph records of the recent earthquake off the Dominican Republic, U. S. Coast and Geodetic Survey seismologists disclosed.

With this new picture, a more accurate location will be possible for future quakes in the West Indies. The study, combined with data gathered on the Cuban tremor in February, 1932, will show the speed of seismic waves in the Caribbean area.

Seismologists know that the speed of these quake waves varies in different areas of the world, but a standard figure is now used because information is lacking about the regional differences.

With the new information, seismologists will know more about future earthquakes, but they still will not be able to predict them in advance. The places can be noted that might have quakes, but no one can forecast when they will happen, warn the seismologists.

Science News Letter, September 14, 1946

PSYCHOLOGY

There's More Than Talk Behind Jive Cats' Cracks

➤ TEEN-AGERS' amazing melange of slang, double-talk and wise-cracking serves other purposes than its primary ones of exchanging information and gossip and establishing social contacts, Dr. Mary C. Jones of the University of California told the meeting of the American Psychological Association, in Philadelphia.

In a four-year study of the daily conversation of 200 adolescents, she found that their talk was also used "to release tensions, bolster the ego, and channel aggression." Adolescent language, she stated, "was typically colorful (slangy, idiomatic); highly charged (vituperative, ecstatic); ostentatiously careless; centered largely in personal and interpersonal relationships."

But alas, time takes its toll, even in the golden age between 13 and 17. By the time her chin-happy 200 had reached the estate of high-school seniors the bright bloom of their speech had already begun to fade; they were beginning to use at least a little more ordinary English.

Negro girls from the North make a better showing than their sisters from the South when it comes to college intelligence tests, Dr. S. O. Roberts of Fisk University stated at the same session. He found that the occupations of the girls' mothers appeared to have more influence on their scores than their fathers' occupations.

Science News Letter, September 14, 1946

ENGINEERING

Cruisers Will Be First Of Air-Cooled Fleet

➤ EXPERIMENTAL air-conditioning of two heavy cruisers now under construction will be the forerunner of a virtually completely air-cooled fleet, the Navy indicated.

Denying that the Navy is "trying to mollycoddle its personnel," Vice Adm. E. L. Cochrane, chief of the Bureau of Ships, declared that efficiency and not comfort was the main aim of the program.

"Admittedly the ships will be more comfortable in tropical climates," the Admiral explained, "but that consideration is not paramount."

"It is to improve the battle-effectiveness that this is being done," he said.

Battle experience in World War II showed that long periods in the heat of the tropics lowered efficiency in proportion to the strain and fatigue of ship crews, Adm. Cochrane said.

Emphasizing that all major combatant ships must be air-cooled in the future, the chief of the Navy's Bureau of Ships reported that installations on the new heavy cruisers Salem and Newport News are experiments to determine what type of air conditioning will best meet the Navy's need.

The USS Salem, being built at the Bethlehem Steel Co. shipyard, Quincy, Mass., has steam-jet air-cooling equipment, while the Newport News, under construction at the Newport News Shipbuilding and Drydock Co., Newport News, Va., will use high-speed freon compressors. Both ships are scheduled to be completed late next year.

Science News Letter, September 14, 1946

PSYCHIATRY

Finger-Painting Diagnoses Two Mental Diseases

➤ FINGER-PAINTING, an artistic outlet for young children, can be used to help diagnose and treat two serious mental diseases, Peter J. Napoli, of Binney & Smith Co., New York, told the American Psychological Association at Philadelphia.

Finger-painting revealed distinct differences between patients with schizophrenia and paranoia and between mentally sick and normal persons, Mr. Napoli reported from a study of approximately 900 cases.

In the finger-painting test, an individual's performance is described in terms of his physical behavior and reaction. Such factors as handedness, color, motion, rhythm, texture, balance, order, symbolism and verbalization are considered.

First group tested was made up of patients who had been diagnosed by qualified psychiatrists and psychologists. Schizophrenics and paranoids were found to have sets of definite characteristics.

In later tests, the diagnosis was not made known and the finger-painting revealed patients of the two diseases, as confirmed by physicians after the tests.

Mr. Napoli said that treatment can accompany diagnosis of the mental disorders using the finger-painting technique, a device that encourages self-expression.

Science News Letter, September 14, 1946

CHEMISTRY

New Wax Comes From Lignite, Peat

➤ WAX extracted from lignite and peat, leaving the peat to be used as fuel, is a wartime research result in England. This wax, an ester, served as a substitute for montan wax which is important in the preparation of carbon paper and many polishes. It is useful also as an insulating material because of its hardness and dielectric properties.

About 5% of lignite and 3% to 12% of dry peat can be recovered as crude wax, reports the Department of Scientific and Industrial Research. The wax content of peat depends upon the kind of vegetation from which it was formed. Peats derived from cottongrass, heather and sedges are relatively rich in wax.

Science News Letter, September 14, 1946

ASTRONOMY

Scientists Explore Sun

Photographs show tiny blisters and prominences of threads of gas on the sun's surface. Coronal storms affect short-wave radio broadcasts.

By MARTHA G. MORROW

► THE SUN'S outer atmosphere, so faint that it can be seen only during a total eclipse, is no longer a complete mystery. An amazing instrument that eclipses the sun every clear day has shown us that:

The sun's outer envelope is relatively stable and rotates with the sun.

Tiny blisters appearing at the surface of the sun shoot luminous gases outwards.

Three or four days after a fiery storm is seen on the east margin of the sun's disk, shortwave radio broadcasts here on earth, nearly 93,000,000 miles away, are likely to be blacked out.

Prominences, seen as brilliant rosy flames during an eclipse, are composed of interlacing threads of gas.

All this has been discovered through photographs taken high on a Colorado mountain top. Using a telescope that produces man-made eclipses, Dr. W. O. Roberts, superintendent of the High Altitude Observatory of Harvard University and University of Colorado, has learned much about the sun's atmosphere and the way it affects us here on earth.

Lifetimes of Observation

The astronomer who could observe as many as twenty total solar eclipses would set a world record. But even he would have little more than an hour of eclipsed sun in an entire lifetime of study of the sun's outer atmosphere. Several lifetimes of observation, however, are crowded into one clear day at the Climax, Colo., observatory.

The sun is not likely to be hidden entirely by the moon more than once a year. A total solar eclipse that lasts five minutes is considered quite good—an eclipse never lasts longer than seven and a half minutes at best. Only from a tiny strip of earth can people see it as total.

If instruments for photographing eclipses were established in a fixed locality, they could be used for just a few minutes once every 360 years. Yet the sun's corona is studied many hours each clear day at this, the world's highest

permanent observatory, more than two miles above sea level

The prominences and corona represent the atmosphere of the sun just as air forms the earth's atmosphere. The sun itself is composed entirely of gases, but they are so compressed by the great pull of gravity that the sun's surface is sharply defined. The prominences and corona are unstable clouds of gas which sometimes rise as high as 5,000,000 miles above the solar surface.

Prominence of June 4, one of the largest ever photographed, pictured on the cover of this SCIENCE NEWS LETTER, is shown about 200,000 miles above the surface of the sun, blocked out by the metal disk in the telescope. White dot gives the relative size of the earth.

Photographs taken at Climax show that the sun's atmosphere is pulled around with it as it rotates. Bright coronal patches spotted on one limb will be duplicated two weeks later as the same feature passes the other limb.

Even though no spots may be visible on the sun's disk, storms in the earth's ionosphere and disrupted shortwave broadcasts usually follow three or four days after a fiery coronal storm is noticed on the same east margin. Sometimes radio communications are blacked

out, and telegraph and electric power circuits completely disrupted. There is seldom any significant geomagnetic activity without bright coronal regions having been located on the east edge of the sun several days previously.

Tiny spike-like prominences have been found on photographs of the sun's outer atmosphere. These spicules usually last only a couple of minutes, never longer than 12. Appearing first as blisters on the sun's edge, a minute or two later they burst, shooting out luminous gases.

Spicules are so frequent that they are thought to form a link between the sun's interior and its corona. It is hoped they will help explain the mystery of the corona's fantastically high temperatures—much hotter than the prominences and much hotter than the surface of the sun itself.

Concept of Prominences

Interlacing threads of gas, in a complicated network, are now believed to make up the flame-like solar prominences. Because we can no longer believe that bright prominences are quite uniform in intensity, our concept of densities and pressures in prominences will probably have to be revised.

Careful records are being kept at Climax in the hopes of some day finding the key to the relation between activity on the sun and weather here on earth. There seems reason to believe that major storm cycles are initiated by



SNOW SLIDE—Dome of High Altitude Observatory, designed specially to study the sun's outer envelope without an eclipse, is shaped to shed snows.



CORONAGRAPH — The coronagraph is a specialized telescope of unusual design, and is utilized for obtaining artificial eclipse photographs of the sun's corona and prominences.

air movements stimulated by sudden changes in solar radiation. Some day storms on earth may be forecast weeks in advance from a knowledge of storms on the sun.

The sun is eclipsed so infrequently and for such brief periods that astronomers interested in studying it in the past were greatly handicapped. But had the moon been a bit smaller or a little farther away, we might not have known about the prominences and corona at all. The moon would have been unable to produce a total eclipse.

Today the sun's corona is studied daily through use of a coronagraph, invented in 1930 by Dr. Bernard Lyot of France. A metal disk in the telescope blots out the sun just as the moon does during a total eclipse, making it possible to see the surrounding bright gases.

Several coronagraphs are actively in use. Dr. Lyot operates a powerful one high on the Pic du Midi in the Pyrenees. Dr. Max Waldmeier installed one at Arosa in Switzerland. Through Dr. Donald H. Menzel, Harvard College Observatory in 1940 established on the Continental Divide at Climax the only coronagraph in the Western Hemisphere.

The sun's outer envelope, extending

into space hundreds of thousands of miles during a total eclipse, appears as a faint pearly halo of light. This greenish-white nebulous atmosphere is about half a million times less brilliant than the sun and its total light a little less than that of the full moon.

To blot out the light of the solar disk and photograph the faint envelope of the sun is no simple task. Face an ordinary camera toward the sun and the picture is usually marred by a series of streaks and blots. These defects are due to reflections between the lenses and from the sides of the camera walls. In a telescope designed specially to study the sun's corona all such reflections must be eliminated or reduced to a minimum.

Until a decade or so ago, a man-made eclipse of the sun was considered a physical impossibility. Ordinary astronomical instruments diffused many hundreds of times the amount of light that the corona radiated into them, and obliterated all traces of the luminous gases in the faint solar atmosphere.

A metal disk at the main focus of the coronagraph, miracle instrument that does produce an eclipse, blots out the sun. A second lens, well behind the disk, reimages the surrounding sky with prominences, spicules and corona. To eliminate light scattered from the edge of the objective lens, a third lens is introduced just behind the occulting disk. This focuses the light upon the camera lens so that the edges can be blocked out with a diaphragm.

Dust-Free Lens

The lens must be entirely dust-free, for each tiny spot on the lens scatters light profusely and shines like a brilliant star. A dusty lens will send far more extraneous light to the plate than is found in the entire corona.

Ordinary brushing or wiping the lens charges the surface with static electricity, causing the dust particles to cling tenaciously. So oil from the human skin is used—with a well-washed finger oil from a well-washed nose is applied to a few spots on the surface of the glass. Then a clean, soft cloth is used to spread the oil over the surface. Babies' diapers were found excellent for this use. When this simple film of face-grease entirely covers the surface, dust particles slide away when you blow.

To be effective, a coronagraph must be installed in an atmosphere as nearly free of dust as possible. Thus observatories having this unique telescope are located high in the mountains. At Fre-

mont Pass the stars shine so brightly on cloudless nights that with the naked eye you can see many seventh-magnitude stars, far too faint to be spotted at sea level.

The observatory itself is unheated, even in sub-zero weather. It has a cone-shaped roof, designed to shed the frequent heavy snows. The house and working spaces are electrically heated so that smoke or warm air from a furnace chimney will not impair observations.

Another coronagraph, larger than the present one and designed for even higher magnification of fine details, is being built and probably will be put into operation at the High Altitude Observatory early in 1948. The old instrument will then be used as a pilot telescope, while the new one will be employed to study radiations of hydrogen, helium and half-stripped iron atoms in the solar corona. When a prominence rises so high above the sun that it would disappear from the present instrument, as happened early last June, the activity of the gases can be captured with the new telescope.

Astronomers hope that within another decade or two a world-wide chain of coronagraphs will permit the behavior of the sun to be watched at all times as if there were a perpetual eclipse. Much remains to be learned about our nearest star.

The coronagraph, which permits the faint light of the corona to be observed regularly, is ideal for most research. But so far only the bright inner portions of the sun's envelope have been visible. Eclipses will have to be relied upon for knowledge of the form and spectrum of the outermost layer. Astronomers will still travel half way around the world to observe the sun's faint outer atmosphere during a total eclipse.

Science News Letter, September 14, 1946

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Do You Know?

Red blood *corpuscles* contain little or no calcium.

A mechanical peanut *sheller* does the work of 300 men.

Kidney diseases rank high as cause of death from internal disorders in the United States.

Potatoes cooked with skins on retain more of their vitamin C content than those peeled before boiling.

The *Hessian fly*, a serious wheat pest, received its name from the belief that it was brought to this country by the Hessian soldiers of the Revolution.

The *umbrella octopus* has a membrane connecting almost to the tips of its eight arms which when spread serves as an efficient trap to enfold fish or crustaceans.

The tendency of persons to grind their *teeth* when high in airplanes has more to do with the dislodging of dental fillings than the high altitude.

As *food insurance* for the coming winter and spring, the Department of Agriculture is urging housewives to top the war record of 4,000,000,000 jars of canned food in one year.



RUBBER BAND—Electric slingshot shoots planes into the air without the initial jarring shock of the conventional catapult. Shown in this Westinghouse photograph is the "roadbed" that provides the power for the shuttle car that is hitched to the plane.

AERONAUTICS

Electric Catapult Launcher

"Electropult," linear electric motor, launches jet planes with a run of 500 feet at 120 mph. It will make possible small, conveniently placed airports.

➤ **ELECTRIC** catapults that launch planes at high speed from a short runway have been revealed with predictions of small and revolutionary airports for future flying. Called the "electropult," the new catapult is a linear motor that has been installed at the Naval Air Test Center, Patuxent River, Md., and Mustin Field, Philadelphia.

M. F. Jones, project engineer for the Westinghouse Electric Corporation, who developed and built the electropult for the Navy, says that the new catapult will make possible floating airports, or seadromes, for refueling in midocean; barge-type airports at the water fronts of large cities; mid-city airports with an elevated "flight deck" several stories above the street; and the continued use

of older airports requiring longer runways for bigger and faster planes.

Laid out flat along the ground, the electropult has a quarter-mile-long track. Planes are attached to a small car that runs on the track at high speeds.

Running free without a load, the car has reached a speed of 226 miles per hour in less than 500 feet. Attached to a plane, the car has sent off a jet fighter plane at 116 miles per hour in a run of 340 feet, compared with the plane's normal run of about 2,000 feet.

Delivering its power in a straight line instead of the usual rotating pattern, the electropult has what would normally be the rotor of a motor in the track, while the coils and steel cores of the stator are carried in the car. (Cont'd on page 175)



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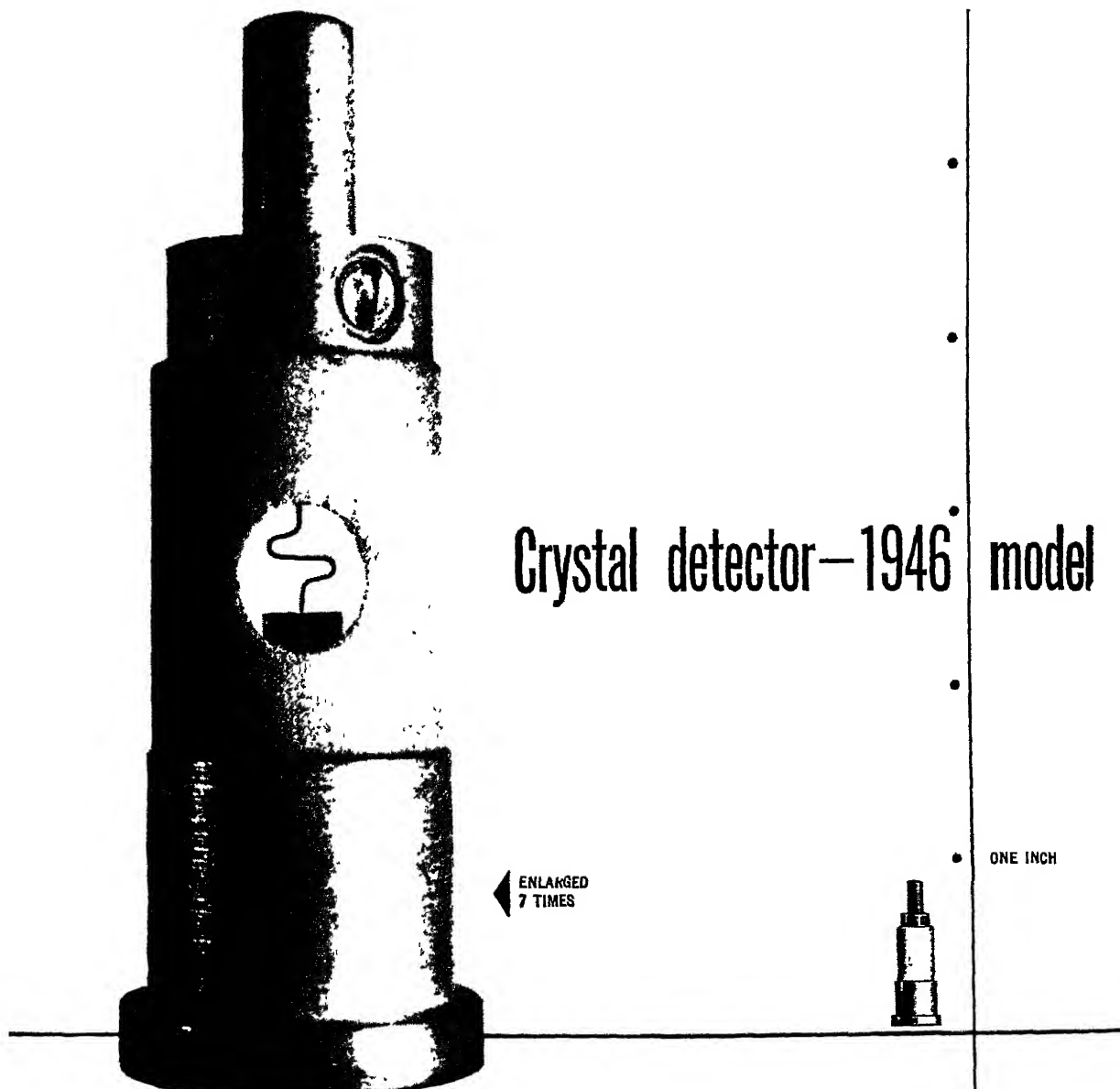
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Remember the crystal detector in the first radios—hunting for the right spot with a cat's whisker? For years the detector lay discarded in favor of the vacuum tube. But when microwaves came, and with them the need to convert minute energy to amplifiable frequencies, a Bell Laboratories scientist thought back to the old crystal.

Silicon of controlled composition, he discovered, excelled as a microwave detector. Unlike the old-style natural crystals, it was predictable in performance, stable in service. From 1934 to Pearl Harbor, the Laboratories developed silicon units to serve microwave research.

Then Radar arrived. The silicon crystal came into its own, and found application in long-distance microwave Radar. Working with American and British colleagues, the Laboratories rapidly perfected a unit which the Western Electric Company produced in thousands. It became the standard microwave detector.

Crystal detectors are destined to play a big role in electric circuits of the future. They will have an important part in Bell System microwave radio relay systems. In various forms, they may reappear in radio sets. Here again Bell Laboratories' research has furthered the communication art.

BELL TELEPHONE LABORATORIES



EXPLORING AND INVENTING, DEVISING AND PERFECTING FOR CONTINUED ECONOMIES AND IMPROVEMENTS IN TELEPHONE SERVICE

CHEMISTRY

War Super-Explosive Sets Off Dynamite Blasts

➤ RDX, super-explosive that powered blockbuster bombs and bazooka rocket projectiles, has been given a peacetime job. Too violent to be used directly as a blasting explosive, it will be used in the caps that set off dynamite charges.

The new RDX caps are only one and one-eighth inches long and less than a quarter of an inch in diameter. They are said to be the smallest blasting caps ever made.

In use, a hole is dug in one end of a dynamite stick and the cap inserted in it. When the cap is detonated, the violent shock of its explosion in turn detonates the dynamite.

Science News Letter, September 14, 1946

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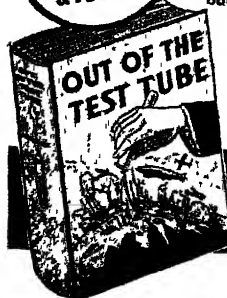
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Bedtime for Bears

➤ BEARS are beginning to go into winter quarters now up in Canada, and at the higher altitudes of their range in our own Rockies. At lower latitudes and altitudes they will remain active for a few weeks longer, but by the time snow flies they all will have retired for the winter. Only in the hammocks and canebrakes of the Gulf Coast region are you likely to find bears on the prowl the year round.

This long winter drowse of the bears is usually called hibernation. Actually, however, it is not true hibernation, claims J. R. Matson (*Journal of Mammalogy*, Aug.). True hibernation, such as is found in ground squirrels and marmots, is a state of death-like sleep, wherein the animal's breath and pulse almost stop and its temperature drops to a point very little above that of its environment. An animal in this state is exceedingly difficult to arouse: pinch it, poke it, even stick pins in it, and it just continues to lie limp as the proverbial dishrag.

A bear in its winter sleep is quite different, Mr. Matson points out. It breathes at about the normal rate for any sleeping animal and its body temperature remains high enough to melt snow that may sift down on its fur. It is not particularly difficult to arouse, and it may even wake up of its own accord and emerge for a shorter or longer period. This kind of winter sleep, he contends, should be called dormancy rather than hibernation.

Mr. Matson also has his own theory to account for the winter sleep, or dormancy, of bears. In his rather extensive experience as a bear hunter, he has frequently observed that bears retire for the winter before winter really sets in—

that they may be found settled down for their long sleep while the weather is still rather mild and there is plenty of food available in the woods.

Invariably, he states, bears "going to roost," before cold weather comes are very fat. The winter-prowlers, he says, are very likely to be animals that did not succeed in putting enough fat on their ribs to induce a tendency to become dormant.

There is an internal index to this physiological drowsiness, he states. In dressing fat bears killed at the beginning of winter, he has found the stomach empty and contracted into a tight, hard knot, into which it would be impossible to get any more food. Apparently when the bear reaches a certain state of fatness it just becomes unable to eat anything more, so all there is left to do is sleep.

Science News Letter, September 14, 1946

BOTANY

Chemical War on Weeds Requires Varied Weapons

➤ PLANNING chemical warfare against weeds requires a good deal of botanical know-how, Prof. A. S. Crafts of the University of California College of Agriculture points out. Each plant family has its vulnerable spots and also its special resistances to poisoning, and the chemical campaigner simply has to know what these are in any given combination of weeds to be killed and desirable plants to be spared.

Easiest and now most familiar case is killing dandelions in a lawn with 2,4-D. Dandelions have broad, flat, easily wetted leaves, and exposed, highly sensitive growing points. Grasses have narrow, upright leaves with water-resistant coatings, and their growing points are covered by the leaf-bases. So although 2,4-D actually is harmful to grass, the weak spray that can kill dandelions is shed by grass without particular damage.

Suppose a near-reversal of the lawn case: a truck-grower's field of lettuce or endive, which are near relatives of the dandelion, with wild grasses invading as weeds. Obviously, 2,4-D won't serve here; it would only kill the paying crop. But lettuce is chemically resistant to certain oils that kill grasses. So a different weapon is indicated.

There are scores of potential chemical weapons in the plant scientist's armory, says Prof. Crafts. But each one must be given its proving-ground test before being released for general use.

Science News Letter, September 14, 1946

From Page 172

Declaring that the electric catapult gains in effectiveness as the size of the plane to be launched increases, Mr. Jones said that designs are completed for electropults capable of launching the largest modern airliners. The largest airliner could be sent off at 120 miles per hour with a catapulted take-off run of 500 feet as opposed to the 4,000-foot runways needed without the launching device.

Passengers on planes launched by the electropult would be pressed back into their seats with a force about equal to their own weight, the engineer explained, adding that the discomfort would be about the same as lying in bed for a few seconds with the feet propped up in the air.

Mr. Jones predicted that the new launching system may eventually replace the hydraulic catapults used on U. S. World War II aircraft carriers.

The electropult was originally designed during the war to launch planes from small Pacific islands and was under construction when the war ended. The installation at Patuxent River has been set up on a 2,800-foot-long concrete runway 100 feet wide. More than 300,000 steel sheets were used in making the track core, while nearly 17,000 high resistance metal bars are fitted into slots in the steel core.

The turtle-like appearing car is 11.5 feet long and 3.5 feet wide. A steel cable, called a bridle, harnesses the plane to the car for the trip that launches the plane.

Riding the tracks on its own wheels, the plane is shot into the air when the car stops as flying speed is reached.

Science News Letter, September 14, 1946

INVENTION

Level Guides Accurately For Contour Farming

► A FARM machine of great potential importance is the subject of patent 2,405,634, granted to C. H. Batterman of Gering, Nebr. It is a device to guide the tractor driver who is trying to guide his furrows accurately along contour lines on sloping fields. It consists essentially of a wide U-tube filled with liquid, with glass sections permitting the operator to see changes in level. This is carried on a truss frame, the rear end of which is attached to the front of the tractor, while the front end rides a three-wheeled truck or dolly.

Science News Letter, September 14, 1946

Books of the Week

AMERICA'S FABRICS—Zelma Bendure and Gladys Pfeiffer—*Macmillan*, 688 p., illus., \$10.00. The book tells the whole story of every basic fiber used in modern fabrics, including the new synthetics the origins, individual characteristics and values of each, the different types of fabrics for which each fiber can be used, and the various finishes and dyes that can be applied to these fabrics.

DIRECTORY OF GEOLOGICAL MATERIAL IN NORTH AMERICA—J. V. Howell and A. I. Levorsen—*Am. Assoc. of Petroleum Geologists*, 111 p., \$1.50 Vol. 30, No. 8, Part II.

FUN WITH PLASTICS—Joseph Lemming—*Lippincott*, 79 p., diagrs and illus., \$2.00. A beginner's book, with directions and designs for the new art of making jewelry, boxes, vases, toys and dozens of useful and attractive gifts from all kinds of plastic materials.

GENTLEMEN YOU ARE MAD—Pierrepoint B. Noyes—*Baxter Freres*, 79 p., \$1.00. A book that draws an awesome parallel between the possible self-destruction of an earlier age, and the potential destruction that confronts mankind today through the uncontrolled release of atomic energy.

INJURY AND DEATH OF BACTERIA BY CHEMICAL AGENTS—Otto Rahn—*Biodynamica*, 183 p., tables, \$3.60. A book discussing the study of the action of that group of substances which stop, delay, or otherwise impede the activity of bacteria.

THE LIMITATIONS OF OPTICAL IMAGE FORMATION—Max Herzberger—*The New*

York Academy of Science, 30 p., 75 cents. Vol. XLVIII, Art. 1.

NOT BY BREAD ALONE—Vilhjalmur Stefansson—*Macmillan*, 339 p., \$3.50. This book tells of the experiences and adventures of Arctic explorers, fur trappers, Indians, and soldiers, who have thrived on an exclusive diet of meat or fish, or meat and fish. It is a study of the least understood of the three main diets by which men have lived.

THE POPULATION OF THE SOVIET UNION History and Prospects—Frank Lorimer—*Columbia Univ. Press*, 289 p., tables, \$4.00. Series of League of Nations Publications II. Economic and Financial, 1946 II. A. 3.

SEX, MARRIAGE AND FAMILY—Thurman B. Rice, MD—*Lippincott*, 272 p., \$2.50. This book discusses in detail every aspect of marriage—the basic sexual relationship, psychological and economic factors, children, in-laws, the physical, mental and emotional changes wrought by time and custom, and the special hazards that beset even the steadiest in these days of shifting values.

TOWARD MENTAL HEALTH—George Thorman—*Public Affairs Committee*, 32 p., illus., paper, 10 cents. The pamphlet tells in everyday terms, the story of nervous and mental diseases, including discussions on fear, nervous indigestion, moodiness, and other emotional sickness. Public Affairs Pamphlet No. 120.

THE WEATHER—George Kimble and Raymond Bush—*Penguin*, 185 p., illus and tables, 25 cents. A handy book of information for the sportsman, the vacationer, the sailor, the gardener, or the farmer, and the man in the street. It gives an insight into how the professional weather forecaster works; it also tells how the ordinary person can read the weather signs and become a fairly useful forecaster himself.

THE WORLD OF NUMBERS—Robert McKay—*Macmillan*, 198 p., diag., \$2.50. A book written not for mathematicians, but for that large public that enjoys the odd facts and fancies that are connected with numbers, measurements and calculations.

Science News Letter, September 14, 1946

DENTISTRY

Teeth Need Three Minutes Of Brushing Every Day

► IN SPITE of all the admonitions about the importance of keeping the teeth clean and how to brush them which the average American gets from early childhood from parents, teachers, dentists and advertising, he does not do as good a job of toothbrushing as dentists advise.

This appears from a study of toothbrushing habits reported by Dr. Hamilton B. G. Robinson of the College of Dentistry, Ohio State University, in the *Journal of the American Dental Association* (Sept.).

The average American, he finds, takes about 267 strokes to brush his teeth but almost never brushes the sides next to the tongue. The crosswise method of brushing, universally condemned by dentists, is still used by one out of three persons. Time spent for brushing the teeth averages 67 seconds instead of the three minutes advised by dentists.

Science News Letter, September 14, 1946

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•New Machines And Gadgets•

☼ **PORTABLE REFRIGERATOR** for picnics uses dry-ice as a refrigerant. The small trunk-like box has compartments for food, one compartment for the solid carbon dioxide, and another in which water is frozen into ice cubes. Suitable ducts for the flow of the carbon dioxide gas are provided.

Science News Letter, September 14, 1946

☼ **MINIATURE MOTORS** for the model airplane builder are true pulse-jet engines weighing one pound. A fuel nozzle mixes air and gasoline in a combustible mixture which enters the combustion chamber through a valve and is ignited by heat remaining from previous explosions. Battery, coil and spark plug give starting ignition.

Science News Letter, September 14, 1946

☼ **NIGHT LIGHT**, to illuminate the face of a clock or other objects, is a flat, polished plate on which the objects are set, and which has tiny neon tubes inserted under hoods on one edge. The light is not strong enough to disturb sleep.

Science News Letter, September 14, 1946

☼ **BOWLING PIN** that whistles when traveling after being struck, has a higher center of gravity and added resilience. It is the ordinary pin with a hole bored upward from the center of its base, and a small air passage from this to the neck of the pin. The large hole contains cork or other resilient material.

Science News Letter, September 14, 1946



☼ **PLASTIC SHIELD** that fits over the body, as shown in the picture, stimulates breathing by artificially raising and lowering the chest. The entire unit, with two extra shields of different sizes, is portable and can be operated by one person. It is a lightweight "iron lung."

Science News Letter, September 14, 1946

☼ **KITCHEN SCRAPER**, to clean pots and pans, uses the familiar scalloped edge bottle cap as a tool. It consists of a knob handle attached to an enlarged base which has a cavity on its lower side into which a cap fits tightly.

Science News Letter, September 14, 1946

☼ **FRUIT PICKER'S** apparatus is an arched frame mounted on wheels, large enough to straddle a tree, and light enough to be pushed from tree to tree. Movable ladders are attached to the frame and can be swung around the tree where needed.

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If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 328. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

Science News Letter Circulation Over 40,000

► THE PUBLISHER'S statement on the SCIENCE NEWS LETTER to the Audit Bureau of Circulations shows that for the period ending June 30, the total net paid circulation including bulk was 40,048. In addition there was a distribution of 1,443 additional copies, including 550 overseas edition subscriptions transferred to the weekly edition, when it became possible to send the weekly edition overseas.

Regular readers will find that their friends and colleagues will appreciate their thoughtfulness in calling attention to the value of receiving the SCIENCE NEWS LETTER regularly.

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Question Box

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BACTERIOLOGY

What good is dead forest litter? p. 166

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What common element has just, in effect, been discovered? p. 163.

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Why dehydrate garbage? p. 163.

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What will make Navy crews more efficient and more comfortable? p. 169.

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SCIENCE NEWS LETTER

Vol. 50, No. 12

THE WEEKLY SUMMARY OF CURRENT SCIENCE • SEPTEMBER 21, 1946



A SCIENCE SERVICE PUBLICATION

MEDICINE

Streptomycin Halts TB

► STREPTOMYCIN may have "tremendous value as a stopgap measure" in treatment of tuberculosis. It may be five years before its real place in treatment of this disease is fully known. More studies of streptomycin for tuberculosis are "urgently needed."

This verdict comes from the National Research Council's committee on therapeutics and other agents. This is the committee, headed by Dr. Chester S. Keefer of Boston, which has been supervising clinical studies of streptomycin and which last week reported results in other diseases. The final report appears in the *Journal of the American Medical Association*, (Sept. 14).

The use of streptomycin in tuberculosis was studied by Drs. W. H. Feldman and H. C. Hinshaw at the Mayo Clinic and Foundation and Dr. Walsh McDermott of the New York Hospital.

Streptomycin is not a cure for tuber-

culosis, the report makes clear. It is considered a palliative. It apparently stops the germs in the body but does not wipe them out. That is why it is considered a valuable stopgap. It can perhaps hold the germs at bay so that other treatment and the patient's own resistance get a chance to overcome them. As a stopgap it could be given before or after other treatment, including surgery. It would have to be given for at least three to six months, even as a stopgap measure, it appears from studies of it so far.

This brings up the problem of harmful effects from the streptomycin. These are not infrequent, the report states, and increase in frequency with increasing dosage. Headache, flushing of the skin, vertigo (not the ordinary dizziness), fever and skin eruptions are among the unpleasant effects of streptomycin.

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MEDICINE

New Malaria Threat

► A NEW malaria threat that will bear watching has been discovered by malaria fighters of the U. S. Public Health Service and the South Carolina State Board of Health, Drs. Curtis W. Sabrosky, G. E. McDaniel and R. F. Reider.

A mosquito named *Anopheles crucians* may be a more dangerous carrier of malaria than its relative *A. quadrimaculatus*, their findings suggest. *A. quadrimaculatus*, or "quad" as it is nicknamed by malaria fighters, has so far been considered the principal malaria carrying mosquito of eastern and southeastern United States.

Crucians, the scientists found when they dissected mosquitoes caught in South Carolina last fall, had five or more times as many malaria parasites in their salivary glands as the quads. Most of the crucians were freshly engorged with blood, but none of it was human or bird and poultry blood, indicating none of the batch caught and dissected had been getting malaria germs from humans or giving it to them with their last biting and feeding.

Crucians has never before been considered important as a malaria carrier. It is widespread throughout the south-

ern states and is more active and relatively more abundant earlier and later in the season than quad, the principal malaria carrier. These facts, the scientists state in their report to the journal, *Science*, (Sept. 13), indicate that "the role of crucians in malaria transmission will bear further investigation."

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CHEMISTRY

Pulp Mill Waste Now Produces Lactic Acid

► LACTIC acid, which has considerable use in industry, food and medicine, can be produced cheaply from sulfate liquor, the pulp mill waste that is one of the nation's worst industrial headaches. A new fermentation process was described by Dr. Reid H. Leonard and Prof. W. H. Peterson of the University of Wisconsin at the meeting of the American Chemical Society in Chicago.

The crude liquor is first steam-treated to drive out sulfur dioxide, slightly alkalized with lime and filtered to remove the sulfite precipitate. Then the fermenting organism, a special strain of *Lactobacillus*, is planted in it. Fermentation for 40 to 48 hours produces a

little under 2% of lactic acid. The acid is taken out of the watery solution with an organic solvent such as amyl alcohol.

Acetic acid, another valuable industrial chemical, is also formed during the fermentation, and can be separated from the lactic acid by distillation. The yields per ton of pulp would be about 285 pounds of lactic acid and 75 pounds of acetic acid. While sulfite waste fermentation to lactic acid is technically possible, it will not solve the problem on the basis of the present market, the Wisconsin chemists pointed out. A mill with a 100-ton-per-day capacity could produce 9,000,000 pounds of the acid per year, which is far in excess of present sales.

Science News Letter, September 21, 1946

DENTISTRY

Penicillin Lozenges For Diseases of Mouth

► PENICILLIN has scored again, this time in the field of dentistry.

Two University of California dentists report that penicillin is probably the most potent weapon yet developed against many diseases of the mouth, and has no peer in the prevention and treatment of infections in dental operations.

Results from the use of penicillin in more than 200 cases were described by Drs. Roy B. Wright and Robert W. Rule, of the College of Dentistry, as spectacular in many cases.

"The results far surpass any previous form of dental medication we have used," the dentists said.

They treated, in addition to cases of infection following operation, a number of oral diseases, including several forms of gingivitis, Vincent's angina, and several ulcerative conditions of the mouth.

The penicillin is administered in the form of a lozenge, which is something like a large tablet. Placed between the gum and the cheek, the lozenge dissolves slowly, bathing the injured area constantly with the drug. The ability to keep a constant high concentration of the drug in contact with the affected area and the simplicity of administration are the chief advantages of the drug used this way.

The dentists noted that while penicillin is not effective against all forms of oral infection, it is lethal to a great many germs causing such infections.

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CHEMISTRY

Atomic Energy Questions

American Chemical Society at Chicago discusses how to use nuclear energy and prevent use of atomic bombs in war. Power from atom economically feasible.

➤ THE TWO prime questions that chemists asked at their national meetings last week were:

Can the destructiveness of the atomic bomb be put under effective control so as to prevent war?

Will atomic energy supply commercial power in competition with coal, oil and other fuels?

The two queries are very much related, because exactly the same processes are used in making power and making bomb material. Unless the problem of control of the bomb is licked on a world scale it won't be safe to allow anyone to use uranium and thorium for generating power.

Among the chemists and other scientists, as among military men, politicians

and others, there are those who go along with the idea that the best way to prevent atomic war in the world is for the United States to continue to make and stockpile atomic bombs and thus scare the rest of the world into not trying to make bombs and using them on us in an atomic Pearl Harbor. Col. Bradley Dewey, president of the American Chemical Society, is a typical exponent of this view.

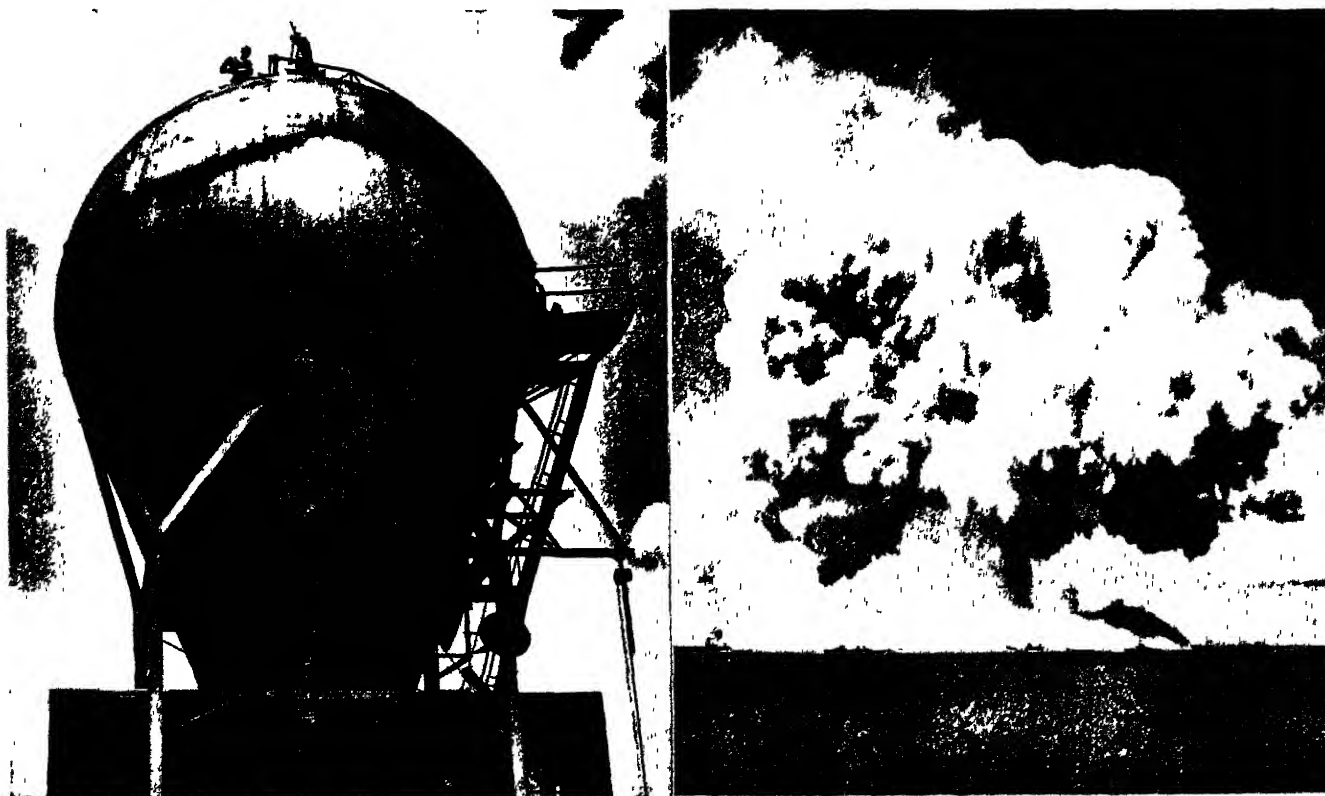
Others will uphold the official U. S. A. plan for a world atomic authority that will assume control over fissionable elements and see to it that they are used for good and not for destruction. Exponents of this view, speaking at the meeting, were TVA Chairman David E. Lilienthal and Dr. Charles A. Thomas of

the Monsanto Chemical Company. Both are among the five authors of the State Department report basic to present United Nations discussion.

Dr. Thomas is the authority whose figures were used in the report on the cost of nuclear power issued recently by the United Nations Atomic Energy Commission. This showed that a large power plant fueled with uranium would produce power almost as cheaply as a conventional coal power plant. Relative costs will be even lower if the cost of coal power continues an upward trend and the solving of technical problems in atomic power plants continues.

But the chemists who work on petroleum and fuels from oil are not unduly worried about being out of jobs in the near future as a result of nuclear energy competition. Changes will come slowly, and years will pass before oil and coal come into any real conflict with atomic energy.

At least two atomic energy power plants are being developed experimentally, one at Oak Ridge, Tenn., and the other at Hanford, Wash. Both of them



DESTINATION UNKNOWN—This huge atom-smasher is being modernized for an excursion into the realms of pure science. It is capable also of producing excursions into destruction with blasts such as the Baker Day explosion pictured above. Photographs by Westinghouse and Joint Army Task Force One.

will merely use the chain reaction pile for furnishing heat to conventional steam boilers and the rest of a standard power plant.

Some extremely tough problems confront the designers. The chain reaction must be operated at high temperatures, and just a little below the explosive fission point. There would be much greater chance of such a pile getting out of hand than the slower-acting piles used to manufacture plutonium or produce radioactive isotopes for medical

and industrial uses. The disposal of radioactive fission products and the materials made radioactive by the pile, all highly poisonous, is another major problem.

These are chemical and engineering problems which scientists and engineers are confident they can solve. They seem simple, despite their complexity, beside the world task of uniting various nations and peoples in a human and political control of atomic energy on an international scale.

Science News Letter, September 21, 1946

CHEMISTRY

Wastes Made Useful

➤ WHEN atomic power runs our great cities, sewage, garbage and other wastes will become valuable assets to the community, sterilized and cleaned by powerful super-radiations so that new and useful products are turned out and drinking water runs out of the sewers.

This was predicted to the American Chemical Society by Dr. Milton Burton, now University of Notre Dame chemist, formerly head of radiation chemistry research in the atomic bomb development.

Cities of the future will run their sanitary waste disposal systems as parts of their atomic energy power plants. Troublesome products now difficult to dispose of will actually become sources of desirable new materials for medical and household use.

Homes, offices, factories and streets will be illuminated by a cold light made possible by radioactive materials manufactured in the atomic energy piles, Dr. Burton predicted. The same kind of longlived artificially radioactive isotopes as are now being distributed for medical use and scientific investigation will be allowed to bombard chemicals to produce intense light without much heat under such radiation attack.

These are the same kinds of phosphors that are used in the popular fluorescent lamps of today. But the future will see lamps without wires carrying electricity to them because their energy will come from the exploding of radiations from radioactive elements created in the atomic power plants.

New chemical processes for industry will result from the penetrating, high-energy radiation obtainable from atomic energy piles in large quantities and at high intensities.

Substances that usually can not be made to combine will join together to form strange and useful products, Dr. Burton predicted, when they are brought under the influence of the powerful atomic radiations. Coal, natural gas and clays will be made to form new compounds of industrial importance, including plastics never before made, even in the laboratory.

New drugs, new vaccines, new radioactive dyes that will have curative properties for specific parts of the body are also foreseen.

New kinds of plants and animals, resulting from changes in the germ cells of new generations produced by the atomic radiations, are other possibilities.

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CHEMISTRY

Now Sugar Coating Protects Dinner Table

➤ SUGAR-COATING the dinner table to make it proof against spilled cocktails or marring from hot dishes is a possibility when new discoveries by Dr. E. Yanovsky of the U. S. Department of Agriculture's Eastern Regional Research Laboratory at Philadelphia are applied.

A film of allyl ether, from many kinds of sugar, including the sucrose we put in our coffee, is placed on wood, metal, cloth or other material. Then it is changed into plastic, right in place, by heat and oxygen, so that a coating extremely resistant to solvents, oils and heat is formed. Starch from potatoes, corn and tapioca can be used in much the same way. Glycerine and ethylene glycol, antifreeze chemical, can also be treated in the same way to get sturdy plastic castings.

Science News Letter, September 21, 1946

CHEMISTRY

Rubber Production Speeded By New Accelerators

➤ POSTWAR production of natural rubber will be materially speeded up by a new method of coagulating the crude rubber and getting it out of the latex as tapped from the trees, which was described before the meeting of the American Chemical Society. The method was developed at the Malayan Research Laboratories of the B. F. Goodrich Company. Certain phenols, fatty acids and alcohols have been found most suitable.

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ASTRONOMY

Moon Has No Atmosphere

Light and dark fringes sweeping across a telescope as a star disappears behind the moon confirm belief that the moon is without an atmosphere.

► FURTHER evidence that the moon has no atmosphere was obtained through observations of the diameters of stars by a unique method described by Dr. A. E. Whitford of Washburn Observatory, of the University of Wisconsin, at the meeting of the American Astronomical Society to which Washburn Observatory played host.

One of the long-standing problems of astronomy is that of the direct measurement of the apparent diameters of the stars. We know that stars are large—many of them hundreds of times bigger than the sun—yet their tremendous distances reduce them to apparent pinpoints of light which defy enlargement even with such telescopes as the 100-inch on Mt. Wilson.

It is with this same telescope, however, that Dr. Whitford this past summer observed stars disappearing behind the moon. It is notable that in the past the star has always been seen to disappear instantaneously behind the moon, and this fact has often been cited as proof that the moon has no air. If it did have air, then the star's light would gradually diminish instead of snapping out instantly.

Dr. Whitford points out, however, that the optical effect known as diffraction really makes the pointlike star image have a series of rings at the time the moon hides the star from our sight. Diffraction phenomena have been known to physicists for over a century, and light and dark fringes a few thousandths of an inch apart can be seen under proper conditions at the edge of the shadow of an obstruction. In the case of the moon, however, the obstruction is 238,000 miles away and the diffraction fringes are therefore 30 feet apart. They sweep across the telescope at a speed of over 1,000 miles per hour. But because the star is not quite a point, the fringes are not as pronounced dark and light as would otherwise be expected and from this difference the star's diameter is calculated.

"Thus with the moon's aid, it is possible to circumvent the inability of even the largest telescope to make any star

appear other than as a point," said Dr. Whitford. "The largest diameter, expressed as an angle seen at the earth, was 1/120 of a second of arc, equivalent to a pea at 75 miles. The smallest diameter measured by this occultation method was about one tenth as great. The close agreement with theory confirms the belief that the moon has no atmosphere. Even a trace would have hopelessly blurred the fringes."

To obtain the required high-speed record of the way the star's light varied as it went behind the moon, Dr. Whitford employed a photoelectric cell, an oscilloscope, and a moving-film camera. There is a waver in intensity lasting for about 1/50 of a second before the star goes out, and this waver is what the apparatus he devised was made to analyze.

See Front Cover

The picture on the cover of the SCIENCE NEWS LETTER, if held at a distance of about 40 feet, will appear to the naked eye as the moon does in the sky. Tycho (at top south) is the crater from which the ray system radiates—makes full moon look like a peeled orange. Turn the picture upside down for non-telescopic view.

The photograph was taken with the Lick Observatory 36-inch refractor by J. F. Chappell, Lick Observatory staff photographer. The moon was aged 13.8 days and the cover reproduction is three-quarters of the negative size.

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ASTRONOMY

Moon Rockets Fairly Safe From Meteorites

► SPACE ships of the future may be equipped with relatively thin coverings and still be well-protected from the run-of-the-mine meteors which haunt the solar system, Dr. Fred L. Whipple of Harvard College Observatory told members of the American Astronomical Society meeting.

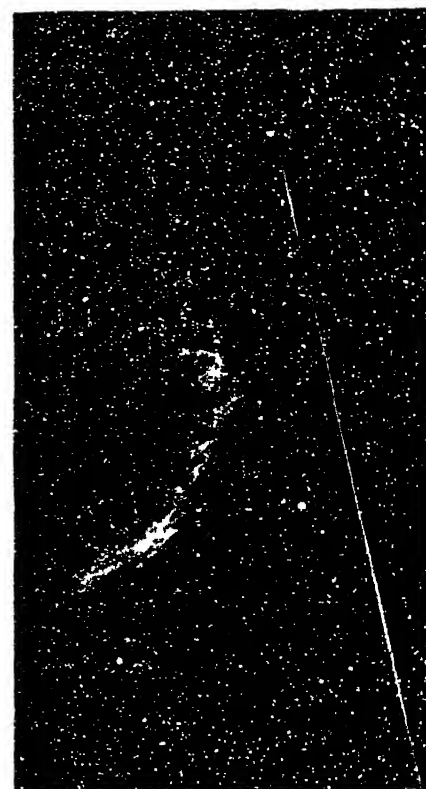
Dr. Whipple defines the average meteor or "shooting star" as one of the eighth

magnitude. That is, when such a meteor penetrates the earth's atmosphere and the friction heats it to incandescence, it is not even bright enough to be seen with the naked eye, which can see only to the sixth magnitude (the higher the magnitude the fainter the star). The brighter ones that are seen as flashes across the sky are much less abundant.

The average meteor is the size of a small pinhead and weighs about a milligram. Nevertheless, it travels through space so fast that an unprotected rocket ship might soon come to grief.

But a spherical space vessel 12 feet in diameter covered with a one-quarter-inch steel skin will be penetrated by a meteorite corresponding to an eighth magnitude or brighter meteor at the rate of only once in 50 years. For thinner coverings, however, the probability of penetration increases rapidly.

Dr. Whipple suggested further protection from larger meteorites in the form of a millimeter-thick sheet of metal surrounding the one-quarter-inch skin of the space vessel at a distance of an inch. But this may prove unnecessary



METEOR STREAKS SKY—It is meteors such as this one photographed at Yerkes Observatory that threaten rocket ships of the future.

for 50 years is a long time for one space trip—or it may be considered as representing many, many trips.

The very rare collision that may occur with a large meteorite, say the size of a

walnut or a baseball, would completely destroy the space ship. Fortunately, the probability of such an encounter is very small.

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ASTRONOMY

More Repeating Novae

➤ STARS that are known to suddenly flare up to thousands of times their original brightness are becoming more numerous. This is because of further study of past observations as well as of new ones continually being added to the list.

Harvard astronomers Margaret Walton Mayall and Leon Campbell told of the behavior of the recent recurrent nova, T. Corona Borealis, and the addition of Nova Sagittae 1913 to the list of repeating novae, at the meeting of the American Astronomical Society.

The word nova is used by astronomers to describe a star which suddenly flares to a thousand or tens of thousands of times its usual brightness. It is not really a new star at all, but a special type of variable star. The nova outburst seems to be a kind of safety-valve outlet. Evidence indicates that the longer the period between outbursts of the same star, the brighter it becomes when it does burst. All novae rise to maximum brightness in a few hours or days, then

slowly fade away to their former insignificance.

T Cor Bor, as astronomers call the nova in the constellation of the Northern Crown (Corona Borealis), originally rose to the second magnitude in 1866. Just 80 years later it repeated its rise again, becoming nearly as bright.

Leon Campbell, recorder for the American Association of Variable Star Observers, stated that the rate of decrease from maximum to minimum light of the 1866 and 1946 outbursts was practically the same, the forms of the curves at minimum are nearly identical and the rise to a secondary maximum alike, both for time elapsed after the initial outbursts and the magnitude attained.

"Whatever the underlying causes in the behavior of T Coronae Borealis at these two outbursts, it would appear that they must be the same. The study of recurring novae thus becomes all the more important," Mr. Campbell said.

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ASTRONOMY

Star Space Not Hot

➤ "INTERSTELLAR space is not so hot!" Dr. Lyman Spitzer, Jr., of Yale University Observatory, stated at the meeting of the American Astronomical Society. His studies show that interactions between gases and solid grains, which have previously been neglected, will cool down the interstellar gases.

How low the temperature may fall is still quite uncertain, since information is lacking on the many physical processes which affect the final temperature. But temperatures similar to those found on the earth may be quite possible in interstellar space.

It has been realized for some time that the temperature of matter between the stars is very different for gases and for small solid grains of the size of dust and smoke particles. The solid grains radiate their energy so effectively that out in space, far away from any one particular star, their temperature falls to a

very low value—around 459 degrees below zero Fahrenheit, the absolute zero at which all heat is gone. Gases, on the other hand, radiate energy so poorly, especially at lower temperatures, that if left to themselves out in space they would come to about the same temperature as that of the surface of a typical star—about 20,000 degrees Fahrenheit.

Ionized Gases

In some regions of space, Dr. Spitzer stated, the gases—predominantly atomic hydrogen—are ionized. In such regions the energy absorbed in repeated ionizations keeps the gas temperature up to nearly the 20,000 degrees mentioned above. However, in those regions where the gases are not ionized, the gas temperature may be reduced to a low value by the cooling effect of the solid grains.

"The presence of such low gas temperatures is significant," Dr. Spitzer said,

"in that it may facilitate the condensation of gas into additional solid grains. Such condensation may be an important step in the continual formation of stars from diffuse matter spread out in space." The growth of stars is one of the fundamental problems astronomers are especially trying to solve.

Science News Letter, September 21, 1946

ASTRONOMY

Location of Galaxy Center Found by Infrared Probing

➤ NEW light has been thrown on the position of the center of the Milky Way galaxy, but it was "dark" or infrared light. Dr. Joel Stebbins and Dr. A. E. Whitford, astronomers at the University of Madison's Washburn Observatory, told members of their work during the summers of 1945 and 1946, using the 60-inch reflecting telescope atop Mount Wilson in California.

The apparent position of the center of our galaxy in the direction of the constellation of Sagittarius has been known for a quarter of a century, but a bright nucleus or clustering of stars about the center as in other galaxies has never been observed, presumably because it was obscured by interstellar dust clouds.

To penetrate the interstellar clouds, the Wisconsin astronomers used infrared light. The effect is just the same as using a color screen and red-sensitive plates to photograph more clearly distant landscapes seen through the earth's atmosphere. They attached to the 60-inch telescope a photocell and filter glass giving effective sensitivity near wavelength 10,300 angstroms, or 1.03 microns, definitely in the infrared region well beyond the sensitivity of the human eye.

They swept the telescope across the region of Sagittarius, repeating each sweep with red or violet filters to identify foreground stars and star clouds by their color. Any feature near the actual center of the galaxy would surely be much reddened by the greater absorption of its light while traveling the greater distance to reach the earth.

Parallel to the equator of the galaxy, a persistent bulge was found, its form being roughly outlined by an elliptical figure some 8 degrees long and 3½ degrees wide, with its center at longitude 326½ degrees. The apparent photographic magnitude (not infrared) of the bulge would be magnitude 24.5 per square second, or only 1/10 the brightness of the darkest patch of blank sky in the neighborhood.

Science News Letter, September 21, 1946

DERMATOLOGY

Adults Have no Ringworm

Ringworm of the scalp disappears when children begin to grow up because fat glands of scalp secrete acids that can kill the fungus causing it.

► THE REASON why grown-ups never get ringworm of the scalp and children get over it even without treatment when they start growing up at the age of 12 or 13 has been discovered by Stephen Rothman, Adelaide M. Smiljanic, and Arthur L. Shapiro of the University of Chicago and Alfred W. Weitkamp of the Standard Oil Company of Indiana.

It is because, starting at the time the child begins to mature, the fat glands of the scalp start secreting much more of certain fatty acids that can kill the fungus which causes scalp ringworm. Hair fat of grown-ups has five times the fungus-killing action that children's hair fat has, the scientists state in their report to the journal, *Science*, (Aug. 30).

They recently collected over 100 pounds of hair from grown-ups, representing more than 10,000 haircuts. From this they extracted certain fatty acids which had anti-fungus activity. One of them is called pelargonic acid. They hoped this could be used to cure ringworm in children, but in actual trials it did not. They believe it might be used to check epidemics but this has not yet been tried.

They tried mixing it with material which would enable the fatty acid to penetrate the hard keratin material of the hair, but results so far have not been encouraging.

The natural recovery from ringworm that comes with maturity, they conclude, is due to the higher concentration of certain fatty acids and to their getting into the inside of the follicle or little sac from which the hair grows. From this it gets to the surface of the hair and the surface of the scalp. Infected hairs remain infected until they fall out, but new hairs replacing them are protected from infection by the fatty acids inside the hair follicle. When all the infected hair has fallen out in the course of natural shedding, which proceeds much more slowly in small children, the infection is cleared up, never to return if the child has begun to mature.

Pelargonic acid or similar fungus-checking substances might check epi-

demics of ringworm if used on non-infected children because the spread of the fungus from one hair to another via the follicular wall to the scalp and from there to the inner follicular wall of the next hair and to the hair shaft outside the follicle or sac can be checked.

Science News Letter, September 21, 1946

ASTRONOMY

Harvard Will Erect New Type Telescope

► A NEW type of telescope will be erected at Harvard Observatory's station in South Africa through international cooperation among the governments of Eire and Northern Ireland, and Harvard University.

Dr. Harlow Shapley, director of Harvard College Observatory, told members of the American Astronomical Society that just prior to the meeting last week he received from Dr. Eric Lindsay, director of the Armagh Observatory, Ireland, a cablegram reporting the full concurrence and participation of the two Irish governments in the plan.

The telescope, to be of a new design by Dr. James G. Baker of Harvard, is an adaptation of the well-known Schmidt Camera. Schmidt telescopes combine a thin correcting plate or lens, and a spherical mirror. Dr. Baker's design adds another mirror to the system, producing a flat field instead of the curved field. This eliminates the necessity of curving the photographic plates.

The area of the sky to be covered by the Baker-Schmidt camera is more than 10 times as large as that of an ordinary reflecting telescope. Very short exposures are possible, enabling rapid photographing of faint stars and nebulae.

This plan for international cooperation was first discussed by Prime Minister de Valera and Dr. Shapley when the latter was on his way to a meeting of the International Astronomical Union at Copenhagen last March. Irish astronomers will share in the operation of the new instrument and will study the nature and distribution of stars in the Milky Way, portions of which, inac-

cessible to northern telescopes, can be observed in South Africa.

Science News Letter, September 21, 1946

MEDICINE

Shocked Mouse Squeaks To Test Drug Potency

► A 15-VOLT electric shock on the tail is enough to make any mouse squeak. But, when fortified with aspirin or more potent morphine, mice at the Wellcome Research Laboratories, Tuckahoe, N. Y., bravely hold back their squeaks until the effects of the pain-relieving drug wear off.

By counting the number of shocks tolerated before a drugged mouse squeaks, Drs John F. Reinhard and Edwin J. de Beer have accurately tested the strength of many common drugs, they reported.

Using morphine as a standard, the scientists have measured the potency of varying doses of alcohol, acetophenetidin, acetanilid, antipyrine, aminopyrine, aspirin, and Demerol by the new mouse-squeak test.

Science News Letter, September 21, 1946

MEDICINE

New Blood Type Is Discovered

► DISCOVERY of what appears to be a new blood type is announced by Dr. A. E. Mourant of the Ministry of Health's Blood Group Reference Laboratory in London.

The discovery was made in examination of blood from two women whose new babies suffered from jaundice which was at first suspected of being the result of Rh substance in the blood. Further study showed that the blood of the two women contained identical substances, called agglutinins, "of a variety not previously described," Dr. Mourant reports in the scientific journal, *Nature* (Aug. 17).

The new substance has been given the name "Lewis" with the permission of one of the women who has it in her blood, Mrs. H. D. G. Lewis, and her husband.

The new type apparently occurs frequently. Dr. Mourant found that 24 out of 96 group O bloods of English people are agglutinated by the new Lewis antigen.

The substance is inherited and may be a Mendelian dominant rather than a recessive character.

Science News Letter, September 21, 1946

SAFETY

Faulty Lights Head Car Defect Hazards

➤ NEARLY one-third of the cars on America's highways have one or more hazardous defects, judging from results of a nation-wide police traffic safety check.

Rear and stop lights not operating headed the list of dangerous faults revealed in the check on more than two and one-half million automobiles between May 15 and June 30, the International Association of Chiefs of Police reports.

More than a quarter of the defects were in the rear and stop lights, with faulty front lights second. Defective brakes, windshield wipers, horns and tires followed in that order.

Canadian police, checking more than 125,000 cars in the same period, found 34.2% with defects compared with 31.6% for the American cars in the check.

Science News Letter, September 21, 1946

INVENTION

New Process Makes Butter Cheaper, More Sanitary

➤ BUTTER can be made more rapidly, at lower labor costs, and in cleaner and more sanitary fashion by a new process that does away with conventional churning, claims Arthur W. Farrall of Wilmette, Ill., on behalf of his system of manufacture, on which U. S. patent 2,406,819 has been issued.

Butter fat in milk or cream consists of separate globules, held apart from their neighbors by their surrounding films of a watery solution of proteins. Churning is simply a mechanical means for breaking these separating films and literally hammering the bits of butter fat together into a mass, Mr. Farrall explains. His process undertakes to achieve the same end without the hammering.

In his highly mechanized setup, the cream is first heated above the melting-point of butter fat. While still hot, it is run through a centrifugal separator which turns it out with a fat content as high as 75% or 80%.

The hot cream is then put through a machine called an emulsion breaker, where it is forced through jet nozzles under high pressure. This breaks the separating watery films and lets the bits of butter fat coalesce into a continuous mass in which the watery whey is dis-

persed in drops. That is, it is now butter.

Further "working," to reduce the amount of whey, is carried out mechanically. Also, by either vacuum evaporation or centrifuging, the watery content may be reduced practically to zero, producing concentrated butter oil, which is more suitable for long storage or far shipment.

From beginning to end, the materials are entirely enclosed, so that neither human hands nor outside air can introduce dirt or spoilage microorganisms.

Science News Letter, September 21, 1946

INDUSTRY

Tobacco Prices Affect Quantity of Frog Legs

➤ IF YOU like to eat frog legs, don't buy any expensive Cuban cigars. The number of frog legs for American eating is partly determined by the price of tobacco in Cuba.

It works this way: when tobacco prices are low, both growers and workers turn to frog hunting for added income; when Cuba's tobacco industry is thriving, less attention is paid to the frogs.

But even with prosperous tobacco prices, Joseph L. Martinez, foreign service clerk at the U. S. Embassy here, has reported to the Commerce Department that a plentiful supply of frogs may mean a big increase in Cuba's frog-leg exports to American tables.

Only eight years old, Cuba's frog legs business with the U. S. reached a record high of 381,457 pounds in 1941 and last year is estimated to have been more than 300,000 pounds. The Cuban Ministry of Agriculture believes that the Island now has sufficient frogs to send 500,000 pounds to the Americans each year.

Cuba has several cleaning and packing stations for the frogs, but there are no commercial breeding ponds because of the feeding problem. Frogs eat live animal food, chiefly shrimps and minnows in Cuba, and when these are not available, the frogs turn cannibals and eat other frogs. A drought following the hurricane of 1944 reduced the numbers of the frogs, but breeding is now reported back to normal.

Frog skins, formerly wasted, may become another important Cuban product, with a New York firm reported to be planning to manufacture handbag fittings, parts of women's shoes and other items from the skins.

Science News Letter, September 21, 1946



CHEMISTRY

Snow-White Potato Chips May Be Available Soon

➤ NO MORE brown streaks in your potato chips—you soon may be buying snow white ones.

A new method that treats raw potato slices with hot water before they go into the hot oil bath was announced by A. R. Patton and W. E. Pyke of Colorado State College at the American Chemical Society meeting in Chicago.

Traces of amino acids and reducing sugars which react chemically during frying to produce an objectionable brown color are extracted by the hot water. If white potato chips lack appeal, evenly colored ones can be fried by the new process.

Science News Letter, September 21, 1946

GENETICS

Mustard Gas Finds Job in Civilian Life

➤ MUSTARD GAS, one of the wickedest weapons of World War I but left on the shelf during World War II, has found what appears to be an extremely important peacetime job. It can change the hereditary character of certain animals and plants, and thus may presently be used by breeders for speeding evolutionary processes, as X-rays, ultraviolet rays and radium are used at present.

Latest accomplishment of this kind has been the production of 29 new physiological varieties of a fungus, by mustard-gas treatment of the parent species' spores. This was done by a four-man research team at Stanford University, whose first report appears in *Science*, (Sept. 6).

The fungus on which they worked has no economic value, but it happens to be a very convenient guinea-pig organism in the lower orders of the plant kingdom. Application of the results to economically important fungi, such as *Penicillium*, may come later.

The research team, who worked at the School of Biological Sciences at Stanford, consisted of Dr. N. H. Horowitz, Dr. M. B. Houlahan, Dr. M. G. Hungate and Dr. B. Wright.

Science News Letter, September 21, 1946

PSYCHOLOGY

Heroes' Talk of Fear Is More Than Modesty

► **HEROES GET** scared. They all tell you how afraid they were when the going was toughest. It isn't mere modesty that makes them say so; they're just stating the plain facts.

At the meeting of the American Psychological Association Prof. Laurance F. Shaffer of Teachers College, Columbia University, gave scientific backing to flyers' own stories of the fears that gnawed at them on practically every mission. Symptoms were greatly speeded heartbeat, tense muscles, irritability, dry mouth, sweating, that "gone" feeling in the pit of your stomach, and a strange sense of unreality. It was worse when there was no immediate way of hitting back.

Among effective controls for fear were confidence in the "Old Man", "talking it up" among themselves, and sheer personal pride. Hope of promotions, pay or medals didn't count much; neither did hatred of the enemy.

Science News Letter, September 21, 1946

MEDICINE

Sudden Weather Changes Affect Body Functions

► **WHEN** the weather suddenly turns hot and humid, as in the tail of a tropical hurricane, the strength of your grip may be reduced.

This was the case among patients in Richmond, Va., studied by Dr. Ernst Fischer of the Baruch Center of Physical Medicine at the Medical College of Virginia.

If, as his preliminary findings suggest, weather affects muscle strength, mechanical efficiency and work production in factories may be distinctly influenced by changing fronts of warm and cold air, he said at the meeting of the American Congress of Physical Therapy in New York.

Using modern scientific methods to check up on Hippocrates, the Father of Medicine, Dr. Fischer believes that Greek physician "had something" when he suggested 2,000 years ago that climate and weather affect bodily functions and influence sickness.

The sharp changes in weather, as high and low pressure areas moving across the country, affect body functions, Dr. Fischer believes.

"In diseases where patients are just able to maintain a precarious balance, weather changes often cause a change for the worse," he stated. "Glaucoma, other eye diseases, tuberculosis, asthma and the psychotic (mental) disturbances seem to be affected by weather conditions. The onset of infantile paralysis seems to coincide with the passing of a cold front during warm summer months.

"Weather changes seem to place an excess burden on the human organism and seem to influence the maximal muscle efforts of normal subjects," he said.

Different persons react in different ways, he added, and the same person's reactions may vary at different seasons.

Science News Letter, September 21, 1946

TRANSPORTATION

Navy's LSM Carries Food in China's Famine

► **RICE FOR** China's hungry millions, instead of fighting men and munitions of war, constitutes the newest cargo for the Navy's shallow-draft Landing Ship, Medium (LSM). One of these sturdy vessels, the USS LSM 470, has just completed its second round trip through the dangerous rapids that bottle-neck the Yangtse river voyage between Chungking, in rice-rich Szechuan province, to Hankow, center of the famine area.

Worst menace in the 600-mile river trip is offered by 130 miles of gorge-choked rapids, where the current runs at 10 to 12 knots. The LSM, which is 300 feet long, with a cargo capacity of 315 tons, made the first up-river run with a load of aviation gasoline and penicillin. The people of Chungking celebrated its arrival with fireworks and flowers. On the test run downstream, the vessel carried a load of embassy furniture from Chungking to Nanking, with a token shipment of 10 tons of rice.

On the second trip, which proved the more hazardous of the two, the LSM settled down to business. The upbound cargo was 300 tons of firebrick needed at Chungking; the down-bound cargo consisted entirely of rice—a full 315 tons.

The Chinese government is now negotiating for the purchase of several surplus Navy ships of this type for use on the upper Yangtse.

Science News Letter, September 21, 1946

CHEMISTRY

Chemicals Keep DDT Safe From Decomposition by Iron

► **A WAY** to keep DDT from losing its effectiveness against insects has been discovered by Francis A. Gunther and Lois R. Tow of the University of California Citrus Experiment Station.

Even moderately high temperatures may cause DDT preparations to decompose and lose their ability to destroy insects, they point out in their report to the journal, *Science* (Aug. 30).

The decomposition is the result of catalytic action of iron. Most technical DDT contains traces of iron or iron salts by the time it reaches the surface being treated.

Two chemicals, picolinic acid (GD 2100) and salicylal-amino-guanidine (GD 2101), the scientists report, will prevent the catalytic action of the iron and protect DDT against decomposition.

Science News Letter, September 21, 1946

PUBLIC HEALTH

Industrial Workers Gain Half Year of Life

► **ANOTHER** half-year of life has been gained, or the end of life postponed six months, for industrial workers during the past year, figures from the Metropolitan Life Insurance Company's records show.

The expectation of life at birth reached an all-time high of 64.95 years during 1945 among the company's industrial policy holders. The figure is a half-year greater than for 1944 and one and one-half years greater than for 1941, the last prewar year.

The gain during the war years is considered extraordinarily good in view of the hardships and dislocations in civilian life and the special risks aside from enemy action run by men in the services.

The gain is attributed largely to two factors:

1. The generally raised standard of living resulting from full employment at relatively high wages.

2. Widespread use of the sulfa drugs and penicillin.

Further extension of life in future is expected as a result of continued efforts of medical science and public health administration which have accomplished so much to prevent disease and premature death.

Science News Letter, September 21, 1946

MEDICINE

One Million Diabetics

Disease occurs almost as often as cancer, and outranks polio 20:1. Insulin saves lives but many problems remain to be solved after 25 years of use.

► THE NUMBER of diabetes cases is 10 or 20 times as great as the number of infantile paralysis cases. It exceeds in many states the number of tuberculosis cases. Diabetes occurs almost as often as cancer. There are well over 1,000,000 diabetics on the North American continent.

These figures were cited by Dr. Russell M. Wilder of the Mayo Clinic and other speakers at the meeting of the American Diabetes Association.

The meeting was held at the University of Toronto to commemorate the discovery there 25 years ago of insulin, the chemical which has given life and health to hundreds of thousands afflicted with diabetes.

Even with insulin, much remains to be done to extend the lives and improve the health of diabetic persons, Dr. Wilder stated. Not all of them receive the benefits of insulin and only a small percentage enjoy the general care they should have.

"These are urgent reasons," he declared, "to arouse the public and the medical profession to the special needs of diabetic patients."

"Diabetic coma can be prevented," he continued. "Diabetic women now may safely go through pregnancy and give birth to healthy babies. Diabetic persons can be protected from the special dangers to them of infectious complications, and from the special risks to them of necessary surgical operations."

"There still remain, however, other aspects of the diabetic problem which have not been mastered and which indeed appear more formidable at the end of this quarter century than they did at its beginning. I refer to the degenerative complications which so frequently accompany diabetes and especially to lesions (disease) of the retina, the kidneys and the arteries."

Insulin Epic Praised

► HIGH PRAISE was given by the president of the association, Dr. Joseph H. Barach of Pittsburgh, to the University of Toronto for the way in which it handled the insulin discovery.

"When insulin was discovered and you had it in the palm of your hand to do with as you liked, when the world would have enriched you with gold beyond the dreams of avarice, you insisted that insulin be made available to everyone who might need it at a minimum of cost, and without material profit to yourselves," he said. "By that fine example, many communities the world over have undertaken to supply insulin to the poor, without any cost at all. You gave insulin to mankind, a finished and a perfected product, and you saw to it that it was made easily available to all who might need it. You have said, and you have lived up to the human ideal, 'that man is his brother's keeper', and for that, again, we honor you this day."

Diet Still a Problem

► THE PROPER diet for a person with diabetes is still a problem and a matter for debate among physicians, it appears from discussions at the meeting.

At the time of the discovery of insulin, diabetic persons hoped the need for dieting would be eliminated. Doctors were cautious but many patients were either reckless or had grown desperate over the strict diets of that day. They took insulin and ate what they pleased. If they escaped serious trouble, authorities say, it was either luck or because they had adopted habits of eating that were good for them and followed those habits in spite of the freedom their doctors may have allowed them.

Diet is still important for the control of diabetes, Dr. Frank N. Allan, of the Lahey Clinic, Boston, gave as his opinion.

For the patient who has just developed diabetes, and especially for young persons, treatment should aim at controlling the disease completely if possible, so as to prolong the patient's life and protect him from complications later, such as eye, kidney and blood vessel disorders. For this aim, diet and insulin are generally needed.

Older patients, those who have had diabetes a long time, or whose diabetes

is so severe it cannot be entirely controlled even with insulin and rigid diet, may be given a more liberal diet and less intensive treatment, the aim being to keep them comfortable.

Psychological factors must also be considered in prescribing diets for diabetics, Dr. Allan pointed out. Some patients want to know all about the disease and the reasons for changes or restrictions in the diet. Others feel overwhelmed by this complicated matter and do better if given definite orders of what to eat and what not to eat.

Diabetic comas, dreaded complication which heralded death in pre-insulin days, is now "inexcusable," Dr. I. M. Rabinowitch of McGill University declared.

The only exceptions are cases in which the coma is precipitated by an infection or some other acute illness which interferes with the action of insulin, he stated.

Coma should not strike more than three out of every 10,000 persons with diabetes, and of these three, only one should die, he declared on the basis of experience in the clinic for diabetes at the Montreal General Hospital.

The death rate among those of this clinic's patients who go into coma is expected to be high, 33%, because the condition develops only in patients having an infection so severe that it blocks the action of the insulin produced in the body or, in insulin-treated patients, of the insulin injected. The chances are, therefore, that it will block the action of much of the insulin being injected to control the coma.

If the coma is caused by faulty diet, the death rate should be very low, since there is no reason why insulin would not act in the usual manner.

High Calorie Diet

► ONLY one death per year from diabetic coma; only one diabetic in four requiring insulin; and one of these four being able to discontinue its use—this is the enviable record achieved among the large group of patients attending the clinic at the Montreal General Hospital. The high carbohydrate-low calorie diet prescribed there is responsible, in Dr. Rabinowitch's opinion. The results of 15 years of experience with it, he stated, bear out the observation made in 1934 that in man, carbohydrates, or starches and sugars, improve tolerance to carbohydrates whereas fats impair it, and carbohydrates increase sensitivity to in-

(Turn to page 190)

CHEMISTRY

**Niacin Production
By New Synthesis**

➤ AN improvement in the method by which niacin, or nicotinic acid, is made was announced by Dr. Donald F. Othmer and Dr. Sidney A. Savitt of the Polytechnic Institute of Brooklyn. This vitamin, now used at the rate of a million pounds a year for flour enrichment, is synthesized from a compound known as beta picoline. Dr. Savitt's contribution consists in a better and cheaper method of separating this from two chemically related but physiologically useless compounds, gamma picoline and 2,6 lutidine.

Science News Letter, September 21, 1946

CHEMISTRY

**Hearts of Atoms
Can't Keep Still**

➤ THE hearts of atoms that make up molecules just cannot keep still. Pulsation in unison is the basis of the bond that holds chemical elements together to form the stuff of the universe. This may sound like a love story of the elements. It is a new theory of chemical bonds presented to the American Chemical Society by a du Pont chemist, Dr. Melvin A. Cook of Gibbstown, N. J. He finds that what attracts and holds together elements can be explained by assuming that the nuclei or hearts of the atoms within the molecule cannot exist in stationary equilibrium but must execute periodic vibrations relative to each other.

Science News Letter, September 21, 1946

CHEMISTRY

**Alcohol Production
Tripled in War**

➤ ETHYL alcohol production was tripled during the war, largely to supply raw material for synthetic rubber, stated Dr. Walter C. Hess, of the Industrial College of the Armed Forces. This capacity is not likely to be needed for peacetime purposes, he added; though demand for industrial alcohol as a solvent, and as a raw material in many industries, will remain very great.

Other wartime chemical outputs that exceed present and immediate future demands mentioned by Dr. Hess were calcium carbide and plastics, both of which were more than double the anticipated needs of this country in 1950. One industry which may be able to

work up to nearly full capacity is synthetic ammonia production. This was needed for munitions in the war, but

is almost as urgently needed for fertilizer in a famine-threatened world.

Science News Letter, September 21, 1946

ENGINEERING

Ohio Floats Giant Drydock

➤ WHEN a large-size floating drydock for ocean vessels slid sideways into the Ohio last month, Pittsburghers took pride because it is the largest ocean craft ever built on the inland rivers of America. It is not, perhaps, the largest built on inland waters; the Great Lakes still claim that honor.

The vessel has a long trip ahead of it before it tastes salt water. It will proceed, manned by the Navy for which it was built, down the Ohio and Mississippi, 2,000 miles to the Gulf of Mexico. First, however, it will rest at an outfitting dock where work of completing the vessel is under way, then undergo lifting tests.

This shiplifting giant, defined by the Navy as an auxiliary repair dock, is 448 feet long, 97 feet wide, and 45 feet high. It is large enough to accommodate ships of the Liberty type. It is an all-metal craft with its hull plates butt-welded. It has no propellers, being

moved from place to place on the end of a towline.

However, for repair work, it is a complete unit with quarters for its crew and skilled mechanics. It has diesel electric generators for light and power. It has machinshops, workshops, and its own water distilling plant. It has recreational space for its men, and tremendous food storage capacity so that many workers can be well fed for long periods at remote places.

Before leaving the Pittsburgh area, the drydock will undergo submergence tests. The Ohio is not normally deep enough for such tests with a floating drydock this size, so a special "hole" has been dug by Army Engineers in the bed of the river just above the Montgomery dam near Rochester, Pa. This provides water 45 feet deep.

The vessel was built by Dravo Corporation, under supervision of the Navy at its Neville Island Yards.

Science News Letter, September 21, 1946



GIANT DRYDOCK—The ARD-33, giant ship-lifting drydock and the largest hull ever built on inland rivers of America, was constructed for the Navy by the Dravo Corporation. The floating drydock was launched Aug. 10, and will serve the U. S. Navy Fleet as an auxiliary repair dock. It has a lifting capacity of 6,000 tons.

Do You Know?

Chinese made iron chain *suspension* bridges 2,000 years ago.

French *wine* production of the future is uncertain because of the war destruction and deterioration of vineyards.

Live *turtles* seem hardly an export commodity, but Costa Rica shipped over 150 tons of them during 1945.

Secondary *roads* used by rural mail carriers in the U. S. A serve 30,000,000 people.

Sulfuric acid is not a plant food, but some 5,000,000 tons are used annually in the United States in fertilizer production.

Why a human being attracts an insect is not quite known; *odor* has been suspected, but skin deodorants have not proved effective as repellents.

Prefabricated cast-iron *houses* were proposed nearly a century ago for shipment to California to relieve a housing shortage in the days of the 1849 gold rush.

SECRETS OF INDUSTRY

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Berries for Birds

➤ AUTUMN brings many bright berries and fruits along with the late brightness of its asters, gentians and cardinal flowers. They are very attractive to look at, these coral-berries, snow-berries, black-haws, false bitter-sweet and all the rest. But their attractiveness is all to the eye; no human tongue, not even that of the omnivorous small boy, could find them tempting. They are either bitter, or impossibly sour, or at best insipid.

Yet birds eat them all, and seem to thrive on them. The hardy feathered sojourners from Canada, for which the snowy zone of the United States is "South for the winter" even eat the dark, gritty-looking fruits of the sumac and the pallid, gray-white berries of poison ivy. They are probably the principal means of distribution for some of these berry-bearing species, for the birds digest the pulp off the seeds, letting the latter pass through their digestive tracts still in viable condition.

How the birds manage to down these ill-tasting fruits, and even make them a major item in their winter diet, is something of a puzzle. Some zoologists claim that birds in general are "taste-blind." If they are, it must be a great help to them, considering the ill savor, not only of these berries but of many other things that birds eat.

If you are a suburban or rural dweller, it would be a good idea to include in your yard plantings some of the bright-berried bushes that birds frequent, setting them out where they can be easily seen from living-room or kitchen windows. Then, when the ground is snow-covered and birds come around to

these natural lunch counters, you will be able to reap without effort the pleasant reward their beauty will give you for the little trouble you have taken.

Science News Letter, September 21, 1946

CHEMISTRY

Edna and Dina: War-Born Twins

➤ TWO war-babies with the deceptively feminine designations of EDNA and DINA were described by Dr. Ralph Connor of the Rohm and Haas Company. They are both explosives.

EDNA is short for ethylenedinitramine, a compound not quite as powerful as the already-disclosed super-high explosive RDX, but less touchy. Also, EDNA could be made out of ingredients not needed for RDX, which permitted simultaneous manufacture without competition for short supplies.

DINA is di-(2-nitroxyethyl)-nitramine, needed for suppressing the blinding flash of artillery powder in night firing. It was of particular value after the development of radar range-finding caused most naval gun battles to take place at night.

Science News Letter, September 21, 1946

MEDICINE

Antivitamin Medicine Foreseen in Future

➤ DOCTORS in the future may prescribe antivitamins as well as vitamins, it appears from a report to the meeting of the American Chemical Society by Morris Soodak and Dr. Leopold Cerecedo of Fordham University.

An antivitamin, as its name suggests, is a chemical that is antagonistic to a vitamin, competing with it for a place in one of the enzymes necessary to normal body functioning.

Oxythiamine, an antivitamin for thiamin or vitamin B₁, was reported by the Fordham scientists. Mice given oxythiamine starved to death for lack of thiamin but other mice were saved by large doses of the vitamin.

Successful competition by antivitamins sometimes starves disease germs as well as animals. This suggests the possible use of the antivitamins as remedies for some diseases.

The most rational approach to the discovery of new chemical remedies, the Fordham scientists pointed out, lies in further study of compounds like the antivitamins which are closely related in chemical structure to substances normally occurring in living organisms.

Science News Letter, September 21, 1946



LIFE SAVER—Good crop years during the war saved Europe.

MINING

Have We Enough Metals?

➤ **WHETHER** the United States is a "have" or a "have not" nation in respect to certain important strategic minerals is an unanswered question, Reno H. Sales, chief geologist of the Anaconda Copper Mining Co., told the American Mining Congress at its meeting in Denver last week.

Wide differences of opinion have been expressed on this question, he said, and some have referred to "vast deposits of low-grade ores" which may be used when better methods of recovery have been developed. The expression, he continued, "may be applicable to certain metals such as iron, aluminum, and low-grade manganese, but it applies neither to copper, lead, nor zinc."

The effect of the war on the ultimate reserve situation "has been greatly exaggerated," he declared. "The war excess production over normal output was not great enough to justify the claim that that war was responsible for the situation in which we now find ourselves. The war made a lot of people metal conscious . . . but I doubt whether the users of metals, including manufacturers and ultimate consumers, have more than a vague understanding of the importance of metal reserves."

There are undiscovered reserves in hidden deposits, Mr. Sales believes. Their discovery, however, "presents an extremely difficult problem under the

present status of our prospecting technique." Everything possible should be done to encourage the prospector and the small miner, he stated, because it is to them we must look for the original discoveries from which reserves are ultimately developed. "There has been no demonstration as yet that our country is in the 'have not' class."

Science News Letter, September 21, 1946

CHEMISTRY

Redheads Have What It Takes—For Red Hair

➤ **REDHEADS** have something blondes and brunets do not have. It is a matter of chemistry, demonstrated at the National Chemical Exposition, held in connection with the American Chemical Society meeting.

It is a new organic compound of iron, which can be isolated only from bright red human hair. Drs. Peter Flesch and Stephen Rothman of the University of Chicago department of medicine discovered that this chemical is one of the class of compounds that changes color with difference in acidity, varying between bright rose-pink and brown.

The redhead iron pigment can not be used to make hair red. It is now merely a chemical curiosity, resulting from fundamental research on the chemistry of hair color.

Science News Letter, September 21, 1946

AGRICULTURE

Good War Crops Spared Europe

➤ **EUROPE'S** famine conditions might be far worse than they are, had not the war years on the Continent also been good crop years, Prof. Wendel H. Griffith of St. Louis University medical school told the meeting of the American Chemical Society. During the war, Prof. Griffith was chief of the nutrition branch of the Office of Chief Surgeon, E. T. O.

Although rationing and hard times prevailed in the cities, he added, the country people in Germany and German-occupied countries did not fare too badly. They simply kept enough of the food they produced to provide for their own needs before sending anything to the cities.

The Nazi policy of deliberate starvation of prisoners naturally worked hardships on prisoners of war, and even worse hardships on political prisoners. The malnutrition itself, however, carried with it a certain kind of protection: due to the slowed-down physiological processes of the emaciated prisoners, the effects of vitamin lacks were less pronounced than might have been expected.

Science News Letter, September 21, 1946

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NUCLEAR PHYSICS

Carbon Nuclei Speeded

➤ **DETAILS OF** prewar tests on atomic bullets three times as heavy as those in ordinary use have been reported at the University of California.

The tests, on the acceleration of carbon nuclei in the 225-ton cyclotron, point the way to methods of producing new trans-uranic elements and non-explosive fission in almost any kind of atom.

The carbon nuclei were accelerated to energies of 96,000,000 electron volts. While this is by far the greatest energy to which any heavy particle has been accelerated, its importance is not in the total energy achieved, since the energy is equally distributed among the six protons and six neutrons in the carbon nucleus, giving each particle an energy of only about 8,000,000 electron volts.

Rather the importance of using this type of atomic bullet lies in the ability to alter an atom more radically than can be done with lighter projectiles. For example, the addition of a carbon nucleus to any atom would result in a jump of six steps up the periodic table; the bombardment of uranium thus should produce element 98, an element not known to exist.

Scientists say that the addition of such energy would make the new atom highly excited. If, for example, bismuth were bombarded with carbon nuclei, the result would be an atom of actinium, which probably would be so highly excited that it should undergo fission.

This type of fission would be expected to yield new information about the atom, but could not be used in producing a new type atomic bomb. The reason is that an atomic bomb depends on a chain reaction in which there is a continuous release of neutrons. The actinium atom would not produce enough neutrons to continue the reaction, which would die out quickly.

At the present time atom-smashing with heavy nuclei is not very efficient, because an intense beam of the projectiles cannot be attained. The reason for this is that heavy nuclei have many more electrons surrounding them than the projectiles in standard use, such as deuterons and protons, and the electrons are hard to strip off. When this handicap is overcome it is believed that the use of heavy bullets will be an im-

portant addition to the arsenal of atom-smashing.

The carbon nuclei experiments were originated by Dr. Luis Alvarez, professor of physics in the Radiation Laboratory, and were continued by Dr. Emilio Segre, professor of physics, and Dr. Cornelius Tobias, instructor in medical physics.

Science News Letter, September 21, 1946

ASTRONOMY

Sunlight Above Ozone Is V-2 Rocket Goal

➤ **SOME** parts of sunlight which are blocked from the view of earthbound telescopes and observatories are expected to be studied with V-2 rockets.

The rocket to be fired at White Sands, N. Mex., Oct. 24, will carry apparatus for photographing the spectrum of the sun in the far ultraviolet region. This is the radiation from the sun which is cut off by the ozone and other layers in the upper air. If it should reach the surface, this radiation would produce devastating effects upon life in general.

Ordinary sunburn is produced by the longer ultraviolet wavelengths that can penetrate the air. At the height of 100 miles reached by V-2 rockets at present, only one-tenth of one percent of the atmosphere remains above the instruments. The ozone layer is about 30 to 40 miles above the surface of the earth.

A spectrograph employing lithium fluoride elements was described to astronomers meeting in Madison by Dr. J. Allen Hynek, Ohio State University astronomer associated with the Johns Hopkins University Laboratory of Applied Physics. This laboratory has charge of the scientific equipment to be carried in the V-2 rocket to be fired Oct. 24. The spectrograph will photograph sunlight during the test. Lithium fluoride transmits ultraviolet light as short as 1,500 Angstroms, whereas ordinary glass does not.

In addition to the solar spectrograph, the rocket will carry two cosmic ray telescopes and associated recording apparatus.

Science News Letter, September 21, 1946

In direct summer sunlight, a brick wall painted white is about 14 degrees cooler than one of unpainted brick.

From page 186

sulin, whereas fats decrease it.

Neglect of diet, which is the cause of coma in most cases reported, is due, Dr. Rabinowitch believes, to the difficulty patients have in following the diet and other measures in treatment. Because the rules at his clinic are easy to follow, patients are more careful to follow them, and therefore more likely to escape coma.

Radioactive Sodium Helps

➤ **RADIOACTIVE** sodium produced in the cyclotron at Columbia University has helped some 500 diabetic patients during the last three years, Dr. Beverly Chew Smith, of Columbia's College of Physicians and Surgeons, reported.

The radioactive material is used to save legs threatened with amputation because of gangrene. It is injected into a vein in the arm. A Geiger counter placed against the sole of the foot clicks off the amount of radiation reaching the sole of the foot from the radioactive material injected into the bloodstream. This and similar counts elsewhere on the leg give the doctor knowledge of the state of blood circulation. He can then tell whether the foot might be saved even if gangrene has started, or if an amputation is necessary, how far up the leg it must be done.

Knee joints can be saved and patients rehabilitated, Dr. Smith declared, urging physicians to make every effort to save the knee joint. Amputation above the knee makes it much more difficult for the patient to get around, even with modern artificial limbs, than amputation below the knee.

Diabetics, especially those with poor circulation, must be taught the danger of cutting a corn or callous and of wearing shoes that raise blisters or press on corns or bunions, Dr. Smith warned. Such activities, especially if the skin is not clean and the scissors or razor not sterile, are almost certain to start the infection that requires amputation to save the patient's life.

In 40 out of 100 amputations at Presbyterian Hospital in diabetics with poor blood circulation the cause of the infection that led to gangrene and loss of a leg was cutting of or shoe pressure on a callous, corn, nail, bunion or blister.

Science News Letter, September 21, 1946

Chile uses much of its whale-oil in the manufacture of soap.

Books of the Week

ADVENTURING IN SCIENCE, DIRECTED ACTIVITIES 1—Powers, Neuner, Bruner, and Bradley—Ginn and Co, diagrs, illus, paper, 64 cents. A workbook to guide pupils in their study of the accompanying textbook, *Exploring Our World*.

AMERICA, 1355-1364—Hjalmar R. Holand—Duell, Sloan & Pearce, 256 p, diagrs and illus., \$4.00. A story of America's hitherto unknown earliest history, of events in the fourteenth century that are fascinating and revealing.

IF YOU ASK MY ADVICE—Henry Pleasants, Jr. M. D.—Bruce Humphries, Inc., 110 p, \$2.00. A varied collection of articles written in plain, understandable language, attempting to bring doctor and patient, or doctor and anxious family down to a common level on certain extremely important problems of life.

PERSONAL COUNSEL—A Supplement to *Morals*—Robert Frank—Informative Books, 306 p, \$3.50. A non-technical book discussing the intimate personal problems of

most young people. This is undertaken inductively by applying the subject matter in hypothetical consultations, in which a physician-columnist is called upon to clarify a number of problems that few people will take the time or opportunity to discuss with a professional counselor.

TWENTIETH CENTURY EDUCATION: Recent Developments in American Education—P. F. Valentune, ed.—Philosophical Library, 655 p., \$7.50. This book is a comprehensive symposium, giving an over-all view of the major issues and problems in contemporary education. The thirty contributors of this volume treat at length all levels of education, from early childhood to vocational and physical training and higher education.

WEATHER GLOSSARY—Alfred H. Thiessen—Gov't. Printing Office, 299 p., 65 cents. A book that clearly and fully defines words used in meteorology. The terms, whether single words or phrases, are arranged alphabetically; the parts of speech, spelling, and capitalization follow usages found in standard American dictionaries. W. B. No. 1445, Aug. 1, 1946.

Science News Letter, September 21, 1946

BIOCHEMISTRY

Protein Building-Blocks Come to the Fore

► AMINO acids, the molecular "building-blocks" out of which proteins are constructed, were very much to the fore in discussions at the American Chemical Society meeting among the nutritional and food chemists. Increased realization of the importance of these compounds came as one result of wartime studies, and increasing ability to deal with them to best advantage in correcting human nutritional deficiencies was reported by several workers.

At the University of Illinois, young men volunteered as human guinea pigs in studies of the relative importances of the various amino acids. Of the 21 known compounds in this class, eight were found to be essential for the maintenance of human life. So long as one of the volunteers received his daily ration of all eight, plus necessary fats, carbohydrates and vitamins, he got along all right. But if one of the eight was omitted from his ration for any length of time, he began to show the effects.

Whereas it was formerly possible to obtain amino acids only by breaking up the protein molecules that contain them, some of them can now be manufactured synthetically on a practicable quantity basis, Dr. C. M. Suter and Dr. Sydney Archer of the Sterling-Winthrop Research Institute told their colleagues. Costs can be expected to go down as volume rises to meet increased demand.

Science News Letter, September 21, 1946

PHYSICS

Inaudible Sound Makes "Impossible" Mixtures

► OIL and water can be made to mix and stay mixed, in a permanent emulsion, by supersonics, which are sound waves of inaudibly high frequencies thrown off by an electrically agitated quartz crystal immersed in oil. Supersonics can also make long-lasting water suspensions of ultra-fine clays like bentonite, needed for numerous technical purposes.

Edward O. Whiteley of New York has invented a special vessel for making these "impossible" mixtures, on which he has been granted patent 2,407,462. It is made of rubber or other flexible material, reinforced with spun glass or asbestos fibers. Its flexible bottom and walls transmit the supersonic vibrations more effectively than relatively rigid materials like glass or metal.

A fluid better than oil for the transmission of supersonic vibrations has been compounded by Dr. Warren P. Mason of the Bell Telephone Laboratories, for patent 2,407,315. It consists of 57% dimethyl phthalate and 43% xylene hexafluoride.

Science News Letter, September 21, 1946

Experiments with rats have given conclusive evidence that pantothenic acid, one of the B vitamins, is necessary for reproduction.

PHYSICS

Maneuvering During Flight Visually Shifts Target

► AN AVIATOR sees an object seemingly move when his airplane performs acrobatic or combat maneuvers although the object is perfectly stationary in relation to the flyer himself.

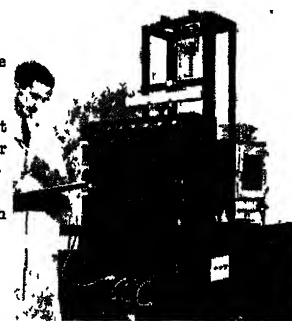
This visually perceived movement, as much as 60 degrees from true position, is due to angular acceleration and centrifugal force, two Naval scientists, Lt. Comdr. Brant Clark and Capt. Ashton Graybiel, of the Navy's School of Aviation Medicine, Pensacola, Fla., stated.

Science News Letter, September 21, 1946

A cyclotron can make more kinds of radioactive isotopes than the uranium pile, but the pile makes dozens of varieties at one time, and makes them in large quantities.

Use of defoliants, leaf-stripping chemicals, saves money for cotton growers by heading off army worms, speeding up hand harvesting, and letting sunlight through to cotton bolls produced on lower branches.

Schering Bridge for measuring S.C. and power factor at 60 cycles, under normal operating voltage, John O. Dolph Co., Newark, New Jersey



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There's a complete description of this advanced design instrument in Catalog E-54(2), sent on request.

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New Machines And Gadgets

✿ **SCREW-HOLDING** screwdriver, designed for setting and driving screws in hard-to-get-at places, has a slidable tube over the shank. When pushed forward, it separates the double blades of the tool, holding the screw securely and preventing the screwdriver from slipping off.

Science News Letter, September 21, 1946

✿ **ECHO-SOUNDING** equipment, of a type developed for the Navy during the war, has a transmitter that produces a supersonic impulse to send vibrations to the sea bottom if within 200 fathoms. The returning echo is picked up by a receiver and converted into electrical energy that actuates the automatic depth-recording mechanism.

Science News Letter, September 21, 1946

✿ **SPINACH WASHER**, for home use, has a perforated cylinder, to hold the leafy vegetables, which can be rotated within a horizontal cylinder, with a base on which it stands in a sink. Water from the faucet enters the outer cylinder, passes through the perforations to the rotating vegetable, and drains out below.

Science News Letter, September 21, 1946

✿ **BRUISE-PROOF** basket is made of open wire covered with rubber to prevent injury to fruit and vegetables tossed



against the sides by harvesters. The picture shows its construction.

Science News Letter, September 21, 1946

✿ **FLOATING STILL** produces drinking water from seawater. A transparent plastic pillow-size bag has stretched within it a black pad of highly absorbent material. This pad is soaked with seawater, the bag inflated with air, and then floated on the sea. The sun's heat turns the seawater into vapor which condenses in the bag.

Science News Letter, September 21, 1946

✿ **AUTOMOBILE** sunshade that covers the entire top of the car is made of suitable material supported in place above the top by a light frame centrally attached to the roof gutters on each side of the car. Front and rear of the frame are anchored by cords to the bumpers.

Science News Letter, September 21, 1946

✿ **MOBILE** restaurant in a truck can sell 1000 ready-to-serve items, such as sandwiches, coffee, ice cream, pie and baked goods, without returning to the commissary. It is built for feeding people at industrial plants or at special gatherings such as ball games.

Science News Letter, September 21, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 329. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

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Question Box

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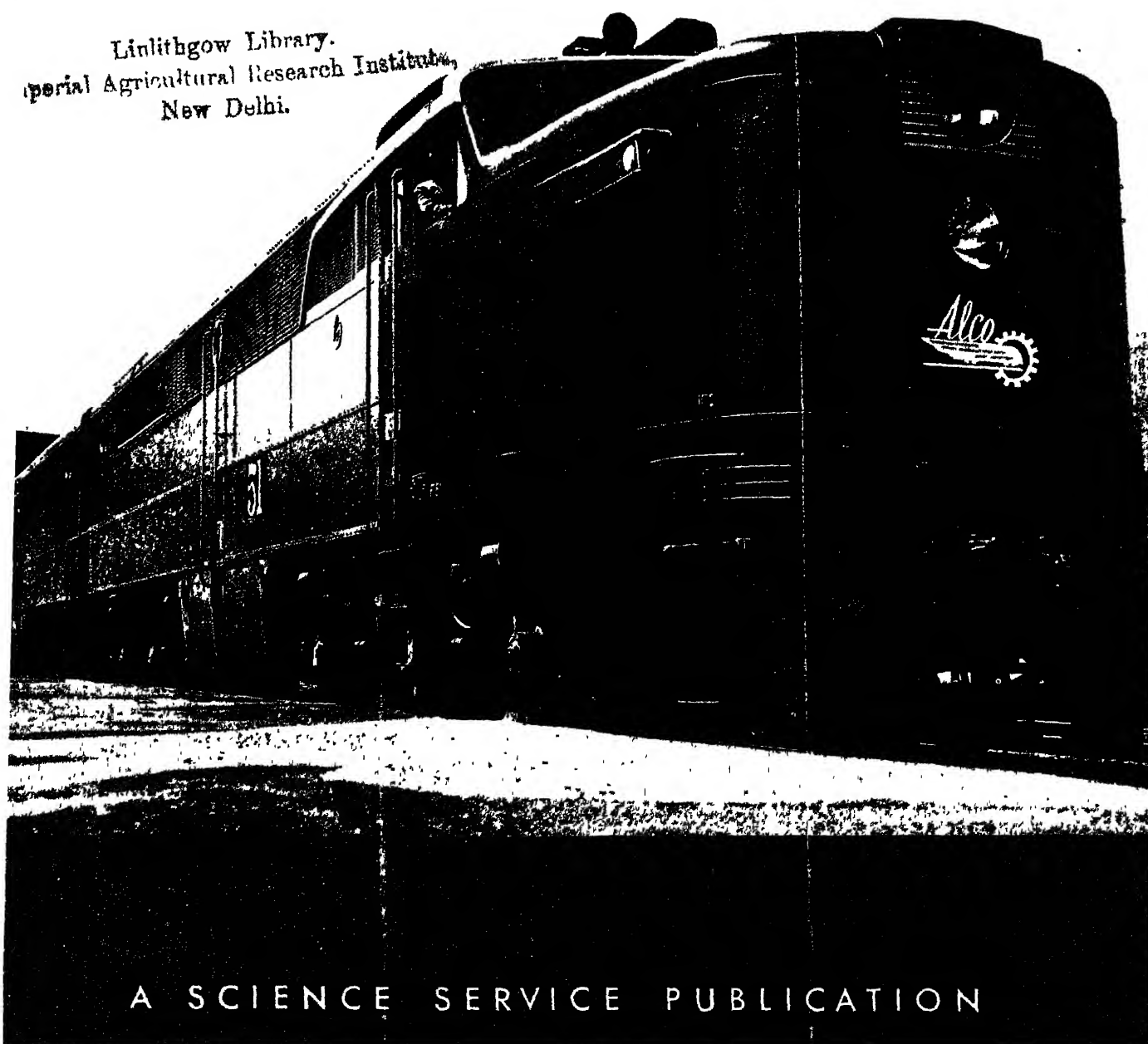
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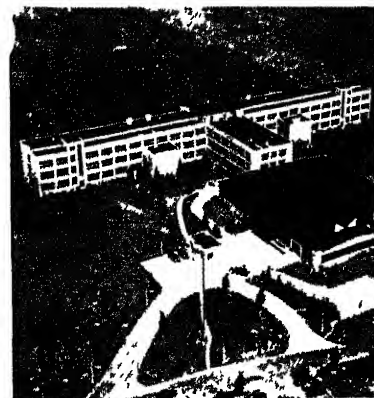
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PHYSICS

Massless Matter Announced

Weightless particles moving with the velocity of light may be possible, according to relativistic wave equations, reports scientist to the American Physical Society.

By WATSON DAVIS

Director, Science Service

► IN THEIR probings of the most basic subdivisions of the universe in which we live, scientists should now look for two new and unsuspected particles that have no weight or mass even though they may actually exist

Dr. E. P. Wigner, Princeton University physicist and head of the Clinton Laboratories, Oak Ridge, Tenn., told the American Physical Society meeting in New York that relativistic wave equations suggest the possibility of such new particles.

These theoretically massless particles would move with the velocity of light, which is the fastest speed possible in the universe.

Often the first step in the discovery of a new particle is the demonstration theoretically that it can exist. This was the case with the neutron, which plays such an important part in the atomic bomb because it is the atomic projectile that fissions the plutonium atom.

Further research will tell whether the particles, or light-like entities, suggested by Dr. Wigner actually exist. There will be two kinds of them, one that can be thought of as analogous to transverse sound waves and the other to longitudinal sound waves.

The most discussed particles in the field of physics today are the mesons which are extremely shortlived products of collisions of earthly atoms with cosmic rays. Evidence of the existence of a kind of meson that is a thousand times the mass of the electron, and five times the weight of the kind of mesons previously known, was presented to the meeting by a French physicist, Dr. L. Le Prince-Ringuet.

New ideas in the important problem of how action one place affects something a distance away were presented by Dr. John A. Wheeler of Princeton University. Looked at with what would be called an everyday, commonsense viewpoint, this results in the possibility that something so affected by something else would sort of know in advance of the

action that something was going to happen. Mathematically, the new theory of action at a distance is useful, and that is what the scientists are interested in, even if it does not seem possible or logical when an attempt is made to put it into words. The new theories are likely to prove of use in understanding the action of very high energy particles such as exist in the cosmic rays and in the giant new atom smashers now being built.

Complete conversion of matter into energy, releasing subnuclear power that would make atomic energy almost old-fashioned, is foreseen as a possibility by Dr. John A. Wheeler, Princeton Uni-

versity physicist, in an announcement at the meeting of the American Physical Society. The atomic bomb changes only a small fraction of its matter into energy.

"Cosmic rays bombarding the upper atmosphere are constantly breaking up protons and neutrons (particles in the hearts of atoms)," Dr. Wheeler explained. This is analogous to the artificial breaking up of the atomic nucleus by fission in the atomic bomb or pile. The cosmic ray bombardment releases particles called mesons which live only two millionths of a second. Exploration of these mesons is a hotly pursued research task today.

Discovery of how to release the untapped power in the elementary particles of matter on a reasonable scale, Dr. Wheeler said, might "completely alter our economy and the basis of our military security."

Science News Letter, September 28, 1946



LEAK DETECTOR—Tiny leaks in the vacuum systems used in atomic research and other electronic and chemical processes can be detected by this device, developed by Westinghouse. If there is a leak, helium gas will enter the system and be detected by a sensitive electronic tube in the large black unit at the left. The amount of helium entering the vacuum system will be recorded on the meter dials, indicating the size of the leak.

NUCLEAR PHYSICS

Cosmic Ray Data Told

Rocket tests give newest data on mysterious radiation in upper atmosphere studied by relays of research physicists.

➤ COSMIC RAYS were counted at approximately 20 times the rate found on the earth's surface by a Nazi V-2 rocket soaring over 40 miles high above the desert at White Sands, N. Mex., scientists at the Naval Research Laboratory reported.

S. E. Golian, Dr. E. H. Krause and Dr. G. J. Perlow announced that a very high rate of penetrating cosmic radiation was revealed by instruments in the weapon fired by the Army's Ordnance Department June 28 carrying instruments planned by the Naval Research Laboratory.

From between altitudes of 200,000 feet and 350,000 feet, multi-channel radio equipment showed the high radiation. While scientists estimated that about 70 percent of the cosmic rays reaching the ground are "hard count" rays that can penetrate six inches of lead, "practically all" the cosmic rays above 40 miles were described as "hard count."

Only 41 seconds of data were gathered by the rocket, the scientists reported, with radio interference blacking out most of the 353-second flight. Data from Geiger counters in the rocket were relayed to ground observers by the radio equipment and were received only for intervals after the rocket had reached 40 miles high and before it began to fall to earth.

The instruments carried on the flight are believed to have been destroyed as the rocket crashed into the sands of the desert, burying its cargo.

One hundred miles above our heads cosmic rays are smashing atoms with more power than any man-made high voltage machine can wield. Dr. J. A. VanAllen of the Johns Hopkins University Applied Physics Laboratory reported to the American Physical Society record-breaking high altitude observations obtained when a V-2 rocket was fired upward on July 30 at White Sands, New Mexico.

Cosmic ray showers were 300 times more numerous in the upper atmosphere than at the ground level. The peak concentration of the mesotron particles generated by the cosmic rays was at 100,000 feet (19 miles).

Data obtained from rocket flights are being studied by a number of research institutions, each laboratory being assigned a rocket in rotation, on a schedule planned to extend at least until next spring. Physicists are eagerly scanning each chapter of the reports from these high altitude tests.

The reason scientists are particularly interested in cosmic rays is that they smash into atoms of the atmosphere and produce particles which may give clues as to how to convert matter into energy upon a larger scale than in the atomic bomb.

The mesotron, the potent particle which is considered to hold the key to the atomic nucleus, has finally been measured with some assurance of accuracy.

Its mass has been shown by direct evidence to be very close to the figure assigned to it by theoretical physicists—202 times the mass of the electron. Calculations had indicated it had a mass of 200.

The figure was reported to the American Physical Society meeting in New York by Drs. William B. Fretter and Robert B. Brode, of the University of California physics department.

The scientists reported the cloud chamber analysis of 26 mesotrons, far more than have ever been observed before in any single study.

Mesotrons are believed in some way to supply the force which gives the nucleus its tremendous energy and binds it into an almost impregnable unit.

Science News Letter, September 28, 1946

CHEMISTRY

Spectrograph Reveals Chemical Structure

➤ THE CHEMICAL content and structure of the molecules of materials other than metals are revealed by a new instrument developed recently. A special type of infrared spectrograph designed by Dr. Donald K. Coles of the Westinghouse Research Laboratories automatically determines how much of what chemical is in an unknown material

and shows the molecular structure.

Heat rays in the infra-red region of the spectrum are beamed through the material to produce an absorption pattern, revealing what wavelength or frequency of radiation has been absorbed. This determines the presence of a certain structural element and the amount is disclosed by the amount of absorption.

The push-button-operated instrument cannot be used for metals but is used for liquids, gases and many solids, including plastics. Dr. Coles says that the new spectrograph also is valuable for fundamental research in showing the molecular structure of materials.

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ASTRONOMY

Venus Outshines Stars

Venus, now the "evening star," will reach its greatest brilliance in October. It is brightest when a crescent, but will be too far south for good observation.

► LOOK TO the southwest these autumn evenings just after sunset, and there you will see (if the sky is clear) a very brilliant planet, which is Venus, now the "evening star." On Oct. 13 it reaches greatest brilliance, with magnitude minus 4.3, more than 60 times as bright as Vega, the most brilliant star to be seen these evenings.

Through a telescope Venus now has the appearance of the moon when three or four days past new; that is, it is a crescent. Moon and Venus appear in the crescent phase for the same reason, namely, that as they swing between the earth and the sun the sunlit hemisphere is turned away from us. But while the moon remains at nearly the same distance whether it is a crescent or full, Venus approaches much closer as the crescent becomes more and more narrow.

This accounts for the fact that while the moon is brightest when it is full, Venus reaches maximum brightness as a crescent. When it is "full" it is far beyond the sun and apparently much smaller than it is in October. By November, it will be still closer, but the crescent will be so very narrow that its brilliance will be reduced again. In October the apparent area of the illuminated portion visible to us is greatest, and then it is brightest.

Even though Venus becomes so bright this month, it is not very well placed for observation because it is almost as far south as it can get, and so it sets soon after the sun. It does not remain up long enough to get a place on the accompanying maps, as these show the appearance of the skies at 10:00 p. m., your own standard time, on Oct. 1, an hour earlier at the middle of the month and two hours earlier at the end.

For a similar reason the innermost planet Mercury, though it is in the evening sky all month and reaches its greatest distance to the east of the sun on Oct. 31, when it is close to Venus is hard to see. It is of magnitude zero, far fainter than Venus.

Saturn, in the constellation of Cancer,

the crab, rises about midnight, while Mars and Jupiter during October are nearly in line with the sun, and hence cannot be observed.

Vega, the brightest star now seen, is high in the west, in Lyra, the lyre. Above it is first magnitude Deneb, in Cygnus, the swan. To the left is the even more brilliant Altair, part of Aquila, the eagle. Low in the south is Fomalhaut, of Piscis Austrinus, the southern fish, a group which makes for these latitudes only a brief appearance in the autumn.

In the northeast we can see Capella, in Auriga, the charioteer. To the right of this constellation we can now see part of Taurus, the bull, with ruddy Aldebaran. A typical constellation of winter-

time, its debut in the evening sky is a reminder that winter is rapidly approaching.

Celestial Time Table for October

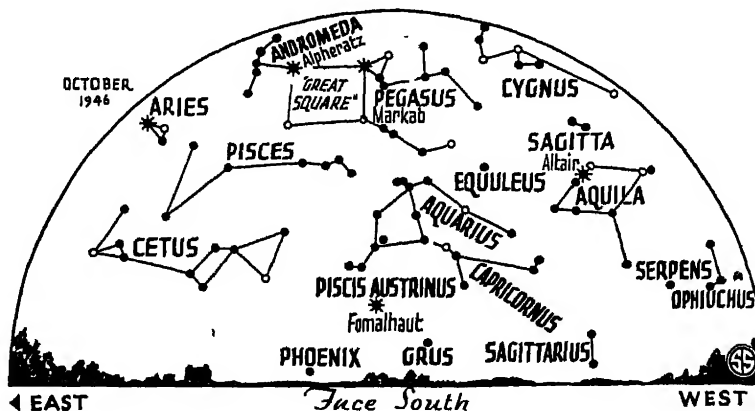
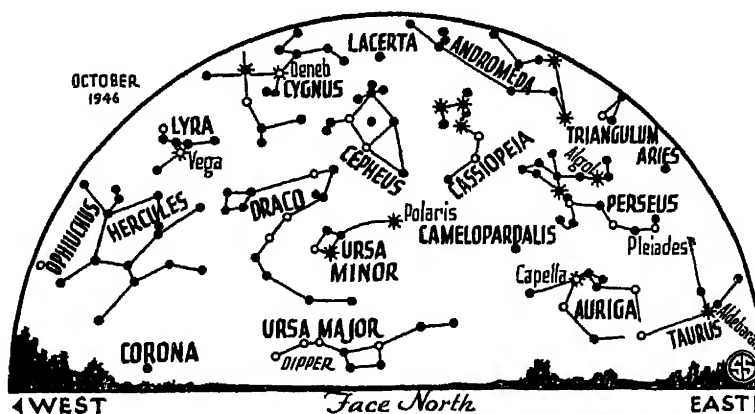
| Oct. | EST. | |
|------|------------|---------------------------------------|
| 1 | 9:00 a. m. | Moon farthest, distance 251,400 miles |
| 3 | 4:34 a. m. | Moon in first quarter |
| 9 | 9:30 p. m. | Giacobinid meteors |
| 10 | 3:40 p. m. | Full moon |
| 13 | 5:00 a. m. | Moon nearest, distance 226,400 miles |
| | 3:00 p. m. | Venus greatest brilliance |
| 17 | 8:28 a. m. | Moon in last quarter |
| 18 | 7:34 a. m. | Moon passes Saturn |
| 24 | 6:32 p. m. | New moon |
| 27 | 6:02 a. m. | Moon passes Venus |
| 29 | 4:00 a. m. | Moon farthest distance 252,000 miles |
| 31 | 5:00 a. m. | Mercury farthest east of sun |
| | 7:00 p. m. | Mercury passes Venus |

Subtract one hour for CST, two hours for MST, and three for PST.

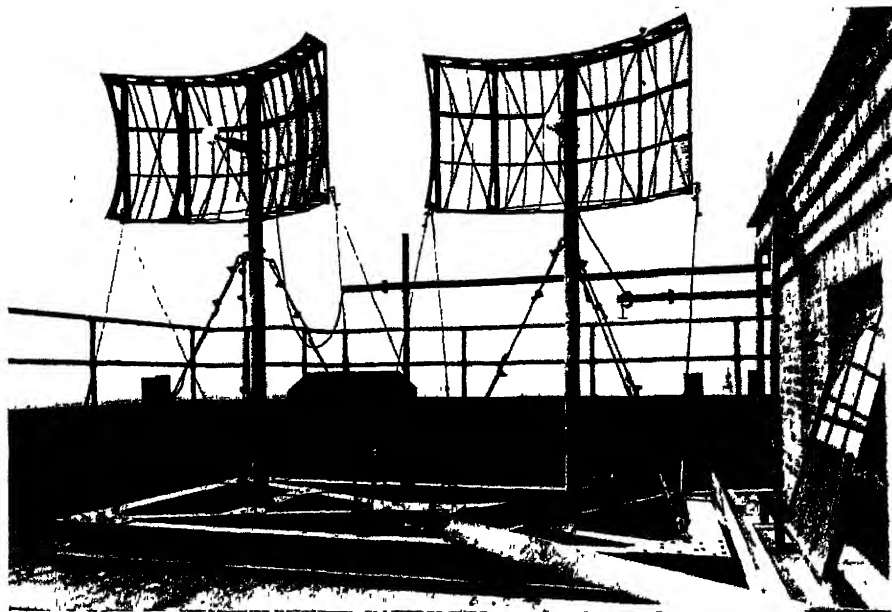
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Plastic floors, more quiet than wood or tile, are recommended for future schoolrooms.

A cyclotron can make more kinds of radioactive isotopes than the uranium pile, but the pile makes dozens of varieties at one time, and makes them in large quantities.



* * * • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



MICROWAVE STATION—Raytheon transmitting and receiving antennas at the New York City terminal. Microwaves travel in straight lines as light waves do. Relay stations are placed on towers or at high elevations as possible so that no hills and mountains intervene.

PHYSICS

Mail by Microwave

Relay stations communicate pictures, maps, and printed pages by radio microwave. This system, unaffected by sunspots, will provide reliable service.

➤ **FACSIMILE** transmission of pictures and printed pages through the air from New York to Boston by radio microwaves was accomplished by the use of six automatic relay stations erected along the route. It is a notable forward step in the science of microwave radio relay communication.

This first public demonstration, exhibiting many advantages of the microwave communication system, was made by Raytheon Manufacturing Company, of Waltham, Mass., and Radio Inventions, Inc. Terminal points for the experimental network are on top of the Lincoln building in New York and the Raytheon plant at Waltham, near Boston. The facsimile signals were carried over a wire line from the Radio Inventions laboratories in New York to the Lincoln building, where they were used to modulate a microwave radio transmitter.

The relay stations are located at Lewisboro, N. Y., Oxford, Bristol and Tolland, Conn., and Webster and Waban Hill, Mass. During the demonstration, Hogan

Faximile, with test equipment manufactured in Radio Inventions laboratories, utilized a 4.8 kilocycle band within the 15-kilocycle Raytheon channel for the transmission of facsimile text, maps and photographs which were received clearly at Waltham. They were transmitted at the rate of 24 square inches a minute. Following this facsimile transmission, a radio program was sent over the relay circuit simultaneously with text from a teleprinter in the New York terminal.

Microwave radio relay communication has advantages. J. Ernest Smith of the Raytheon Company states, "Microwave stations may be beamed on opposite paths operated on the same frequency while located in close geographic proximity. Unaffected by sunspots and other vagaries of radio peculiar to standard frequencies, microwave radio will provide reliable service day and night. Through this medium it may be practical to serve communities not adequately provided with telephone, telegraph, radio, FM, FM facsimile or television coverage."

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AGRICULTURE

1947 Crops Will Need More Fertilizers

➤ **MORE** fertilizers will be needed for crops to be harvested in 1947 than were used even for the bumper crops of 1946 now being gathered into barns, F. S. Lodge of the National Fertilizer Association told the meeting of the American Chemical Society.

The U. S. Department of Agriculture, he said, has set up as needs for the fiscal year 1946-47: 800,000 tons of nitrogen, 1,850,000 tons of phosphoric acid and 800,000 tons of potash. All these figures are substantially higher than the corresponding ones for the 1945-46 season.

It would be possible to meet all these needs, the speaker commented, except for the necessity for exports to meet government commitments to UNRRA, famine relief, and use in occupied territories. These may cause drafts on our reserve supplies, especially nitrogen, which will have to be replaced from the production of converted munitions plants which have been put into operation again.

Time is of the essence, Mr. Lodge insisted. It takes time to manufacture and mix fertilizers; a certain "curing" period is required before marketing; and days or weeks are consumed in transportation. In the meantime, the planting season does not wait.

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CHEMISTRY

Ether and Alcohol Made By Cheaper Modern Means

➤ **CHEAPER** alcohol is made in a modern scientific way from ethylene, the American Institute of Chemical Engineers meeting was told.

Industrial ethyl alcohol has always been prepared by the ancient method of fermentation, but synthetic plants are replacing the sugar, starches, and blackstrap molasses with ethylene, prepared by petroleum cracking operations. Ethyl ether, the anesthetic, is prepared in the same process.

The ethylene is absorbed in sulfuric acid to make sulfates which are hydrolyzed to crude alcohol and a byproduct of ethyl ether, C. M. Beamer of the Standard Oil Company of New Jersey reported.

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ASTRONOMY

Stars with Halos

A new theory for the internal constitution of certain peculiar types of stars is presented at the Zeeman Congress in Amsterdam.

► IN THE heavens there are stars with invisible halos, Dr. Otto Struve, director of the Yerkes and McDonald Observatories of the Universities of Chicago and Texas, stated at a meeting of scientists in commemoration of the 50th anniversary of the discovery of the Zeeman effect.

When we look at Pleione and Gamma Cassiopeiae through a telescope, we see only a small, intensely hot star, Dr. Struve stated. We look right through a thin shell or ring that surrounds the star.

In the ultraviolet region the shell, formed by gaseous matter thrown

off at the star's equator, is nearly opaque. In the photographic region, however, it is almost wholly transparent. If our atmosphere did not cut off all light short of 2900 Angstroms, we should see a large hazy ring of gas.

Gaseous matter in the form of a tenuous ring or shell was thrown off at the equator of two stars, Pleione and Gamma Cassiopeiae, many years ago. We on earth could not see the luminous gas spewing out of the stars, but study of their spectra indicates this stellar disaster occurred.

A new theory for the internal constitution of certain peculiar types of stars

was suggested at the meeting by Dr. Donald H. Menzel, of Harvard College Observatory.

"The sun is by no means the only object to exhibit extreme excitation," Dr. Menzel said in referring to the presence of temperatures of a million degrees in the corona of our own sun. "Objects such as the repeating nova, RS Ophiuchi, display high intensities of highly energized iron lines long after their outburst. There are a number of related objects which show a combination of high and low-temperature excitation simultaneously. Many years ago I suggested that such objects were double stars, consisting of a cool red star and a hot companion. This proposal has been widely accepted, but I no longer subscribe to it."

The Harvard astronomer's new model is that of a single star with a very hot, small, condensed nucleus, surrounded by a very extensive atmosphere that derives its support from a combination of radiation pressure, turbulence, and stellar rotation. The star is built something like a planetary nebula, with a hot core, but with an envelope which transforms most of the high-temperature radiation into red light appropriate to the large radius of the envelope. The surface of this envelope seems at first to be the surface of the star itself.

As for the sun itself, however, Dr. Menzel points out, the source of high coronal excitation and temperature is as much of a mystery as ever.

"The turbulent state of the solar atmosphere suggests that deep-seated disturbances work their way convectively to the surface," Dr. Menzel stated. "Vortices similar to sunspot vortices may be of assistance in permitting material to spurt from the interior through their low-pressure tubes in the center of the vortex."

The Zeeman effect was discovered by a Dutch physicist, Peter Zeeman, in 1896. It is the phenomenon whereby light which is radiated from a source in or surrounded by a magnetic field is divided into parts, polarized in certain ways according to the direction of the field. The spectrum of spots on the sun is easily analyzed to show that sunspots are magnets which produce the Zeeman effect in their radiation.

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During the war the Japanese converted many of the Java tea factories to production of chemicals, textiles and electrical supplies.

ENGINEERING

Streamliner Rides Rails

New locomotive is designed for economy and speed. Three 2,000 horsepower turbosupercharged diesel engines give it a potential speed of 120 miles an hour.

See Front Cover

► A NEW-TYPE streamlined 6,000 horsepower diesel-electric locomotive, shown on the cover of this SCIENCE NEWS LETTER, is a turning point in production of rail motive power.

This Alco-GE locomotive, built by the American Locomotive Company, is powered by three 2,000 horsepower turbosupercharged diesel engines that will deliver more passenger miles, more ton-miles at higher speeds and lower cost than any other heavy duty locomotive now on the rails.

It has been delivered to the Santa Fe Railway for service on fast passenger trains between Chicago and the west coast. Six others of the same type are now under construction for the same road at the Schenectady plant of the locomotive company. This first produced has undergone 30 days severe road tests on the Lehigh Valley Railroad.

Economy in operation is an important feature of this new locomotive.

Its three engines are in separate compartments and can be operated singly, or in pairs, or all together. Two engines can maintain train speeds under favorable conditions. The locomotive, with its three engines, has a potential speed ranging up to 120 miles an hour.

Low fuel consumption is also accountable for the economy of the new Alco-GE locomotive. This is a result of a four-cycle engine and the use of constant pressure turbosuperchargers to increase engine efficiency. Constant pressure turbosupercharging is a method of utilizing hot exhaust gases efficiently to drive a gas turbine which operates a compressor to force air into the cylinders at high pressure.

The three-unit locomotive weighs 450 tons and has an overall length of nearly 195 feet. It can be driven from either end. Controls for all three engine units are placed in both front and rear cabs for this purpose.

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INVENTION

Device Fastens Gun To Motorcycle Front

➤ **MOTORIZED** crime should find an effective discourager in an invention on which U. S. patent 2,407,884 has been awarded to Greenhow Johnston of Richmond, Va. It is a framework making it possible to mount a "tommy" gun over the front wheel of a motorcycle, so that it can be used in the pursuit of fleeing vehicles under conditions that justify gunfire.

A cable release leads from the trigger to a finger-lever on one of the handlebars, enabling the pursuing officer to open fire without even partially surrendering control over his vehicle. Naturally, great accuracy is not expected from this kind of fire; but at hot-pursuit ranges a burst of .45-caliber bullets should punch enough holes in the target (and its occupants) to be effective.

The gun mount is provided with means for traversing and elevating the weapon. These are locked in "road order," but can be quickly released to permit aimed fire from a stationary position. Also, it is possible for the officer to snatch the gun off the mount and use it as a hand weapon.

A modification of the mount is adapted for use on the hood of a motor car or truck; here, traversing and elevating can be carried on by remote control while the vehicle is moving.

For more peaceable purposes, either mount can be used to carry a still or motion picture camera. Pictures made in this way should be useful in the study of traffic behavior—and perhaps also in the courtroom if a transgressor is caught in the act.

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ENGINEERING

Artificial Sunshine Is Possible for Homes

➤ **IF YOU** want artificial sunshine within your home, you can get it, but it takes a combination of various electric lights to approximate sunlight of the summer noonday kind, with ultraviolet rays to give a mild sunburn and infra-red radiation with their heating effects.

Dr. G. F. Prideaux, a General Electric lighting scientist, told the Illuminating Engineering Society how he produced artificial sunshine. He used 300-watt lamps for the red and infra-red

radiation; 3000-watt mercury lamps for the blue end of the visible spectrum; white fluorescent lamps to fill the gap between the mercury and the tungsten lamps; and special sunlamps to produce the ultraviolet. A thin layer of water was used to filter out the longwave infra-red, much as does the water vapor in the atmosphere.

"Approximately one-third of the energy generated is removed by the water filter," he said, "one-third more removed by ventilation above the lamp bank, and the remaining third is radiated into the room and must be removed by ventilation to keep the air temperature down to a comfortable 80 degrees Fahrenheit." Such sunshine rooms, he stated, should be of interest to convalescent hospitals, athletic clubs, and progressive industrial plants.

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CHEMISTRY

2, 4-D Clears Weeds From Pastures, Around Lakes

➤ **2,4-D**, sensational weed-killing chemical that has been getting its first real workout this year, can safely be used to clear weeds out of pastures. Cows can eat it with perfect safety, experiments conducted by scientists of the U. S. Department of Agriculture have shown.

Cows and sheep were grazed in a pasture that had been given a spraying of double the concentration needed for weed control. They developed no symptoms of any kind, and post-mortem examination of some of them after slaughtering showed internal organs perfectly sound.

One cow received a special dose of about one-fifth of an ounce of 2,4-D daily. Blood samples showed its presence in her circulation, but it did not appear in her milk.

The one risk of trouble, the experiments concluded, is the chance of poisonous impurities being present in commercial preparations of 2,4-D.

2,4-D is proving successful in subduing aquatic weeds that shelter breeding areas of malaria mosquitoes along the margins of lakes created by the Tennessee Valley dams.

Experimental applications of 2,4-D have been made by airplane, truck and boat units equipped with power sprayers, reports Dr. E. L. Bishop, TVA Director of Health. Results have been so encouraging that larger use of the chemical is planned for next year.

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IN SCIENCE

CHEMISTRY

Distilling Process Saves Full Flavor of Apples

➤ **FULL FLAVOR** of the apple is captured and held, in a new method for making apple essence worked out by Howard P. Milleville and Roderick K. Eskew of the Eastern Regional Research Laboratory of the U. S. Department of Agriculture in Philadelphia. This overcomes the greatest objection to concentrated apple juice produced by present methods: that it has lost the greater part of the aroma of real apples.

The method is very simple. Instead of just boiling down the apple juice, the two chemists distill the first tenth of it, which carries all the aroma hitherto lost. This constitutes the apple essence. The rest of the juice is concentrated in the usual way for convenience in storage and economy in transportation.

When preparing for use, it is only necessary to add water to bring the concentrate back to its original volume, then enough of the essence to restore the full flavor.

Apple essence can, of course, be used for flavoring other foods and drinks, such as ices and sherbets, fruit jellies and lemonade.

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PHYSIOLOGY

Transplantation of Sex Glands Is Successful

➤ **FEMALE** sex glands of white mice have been successfully transplanted into the bodies of white rats, and the corresponding glands of white rats similarly transplanted into white mice, reports Dr. James M. Sanders of the University of Missouri, in *Science*, (Sept. 13). One rat and one mouse, out of several animals of both species thus operated, subsequently produced normal litters of young.

Ovarian transplantations have previously been reported, but so far as is known they have always been made from one animal to another of the same species. Rats and mice belong to different species, though within the same genus.

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E FIELDS

ANTHROPOLOGY

Group Studies Primitive South American Tribes

► VANISHING remnants of the primitive Indian tribes that inhabit South America's southernmost island, Tierra del Fuego, have been studied by a scientific mission sent out by the Chilean government. A preliminary communication of their results has been sent to the editor of *Science* (Aug. 13) by Dr. Alejandro Lipschutz, chief of the mission.

There are only a few score individuals left in each of the three tribes in the region, and the mission was able to make body measurements of a considerable proportion of them. Blood types were also determined. All pure-blooded individuals examined were of type O, which is the type of American Indians in general. There has been some intermingling of European ancestry, and persons of this mixed stock in some instances had blood of types A, B and AB.

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PHYSIOLOGY

Tried Brain Waves To Power Artificial Legs

► USE of brain waves to manage an artificial leg was the hope of German scientists, an Air Materiel Command Technical Intelligence team at Wright Field learned from questioning the scientists at the Aeronautical Research Institute of Munich.

Brain waves, strictly speaking, are the records of changes in electric potential that accompany brain activity. Electrical changes always accompany nerve impulse. The electric currents are a by-product and, except from the heart's surface, are extremely weak. Amplifiers are needed to detect and measure them.

The German artificial leg had electro-mechanical devices wired to the cut nerve endings in the patient's stump. The German investigators believed that galvanic electricity flowing along the nerves would supply the power impulses and that these could be controlled mentally, manipulating the leg according to the wishes of the owner. The galvanic electricity is the direct current which is a by-product of nerve impulses.

The amputee would employ varying degrees of concentration on the theory that mental intensity would act like a rheostat, controlling the amount of nervous electricity and moving the leg in the manner desired.

"The Germans were as much interested in proving the disputed point of the existence of nervous electricity as they were in perfecting a foolproof artificial leg," investigators of the Air Materiel Command report.

The "electrical leg" was still in an experimental stage when the war ended.

How the Germans expected these weak, microvolt currents to power a leg without an unbearably heavy and bulky amplifier is not stated in the announcement. Neither is there any mention of how the Germans expected to keep the nerve endings in the stump from dying and becoming useless as a source of current.

An electrical arm being experimented upon in this country will be powered by a single, permanent magnet motor in the elbow joint and miniature airplane type storage batteries at the waist of the amputee.

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EDUCATION

Better Roads Must Replace Mud Ones to Schools

► THE OLD mud road leading to the "little red school house" must pass from the American scene, or many of the 4,400,000 rural children who are transported to modern centralized schools will continue to be "ten-o'clock scholars" on snowy and muddy days.

According to Charles M. Upham, engineer-director of the American Road Builders' Association, 40,000 consolidated schools require from 80,000 to 90,000 buses which travel an average of 25 miles daily in one-way operation. There are at least 10,000 other schools that should be centralized, but most of them are on mud roads.

The dollar-and-cents value of all-weather surfaces for secondary or side-roads will benefit rural education, as well as farmers who have to take produce to town. Mr. Upham also suggested that tax-payers will be glad to learn that the average transportation cost of \$24.50 per rural pupil for a year is actually less than the same pupil would spend in streetcar or bus fare in the average city.

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AGRICULTURE

Improved Oat Variety Increases Crop

► RELIEF OF the food shortage is forecast in western agricultural experiments.

Improved varieties of oats that resist rusts and smuts are increasing production in North Central and Northeastern states. It is estimated that the new varieties were grown on about 25,000,000 acres in 1945 and added an extra 250,000,000 bushels to the 1945 oat crop.

Victoria, a vigorous late-maturing crown rust- and smut-resistant variety, was crossed with Richland, an early stem-rust-resistant variety, to make the most important oat hybrid.

Research was done by U. S. Department of Agriculture experts in cooperation with state experiment stations.

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CHEMISTRY

Atomic Bomb Explodes Into 30 Fission Products

► THIRTY self-destroying chemical elements produced by the atomic bomb were made known when two Canadian scientists working at the Chalk River Laboratory of the Canadian National Research Council sent a report to the British journal *Nature* (Aug. 3) on the fission products of uranium 235.

Heretofore, it has been stated authoritatively that radioactive forms of about 30 elements were produced when the bomb exploded or the chain reaction occurred. Only radioactive isotopes of five elements had been actually named: barium, iodine, yttrium, and two rare gases, xenon and krypton.

Drs. W. E. Grummitt and G. Wilkinson in their report list 30 radioactive isotopes, giving their half-lives and their energy levels.

Six of these isotopes are previously undiscovered anywhere: three of tin, two of antimony and one of cesium.

Two of the elements in the debris of the atomic energy reaction are very long-lived. Cesium 135 has a radioactive half-life of about 100 years, while strontium 90 has a half-life of about 70 years.

Two others have half-lives of 290 days, cerium 144 and ruthenium 106.

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ASTRONOMY

Thousands of Stars to Fall

Astronomers are hoping for one of history's greatest meteor showers on the night of Oct. 9 to 10. Meteor streams are too erratic to make positive predictions.

By MARTHA G. MORROW

➤ THOUSANDS upon thousands of "shooting stars" are expected to flash across the sky one night early in October. Plowing through debris left by a comet passing that way just a few days earlier, the earth will cause one of the most brilliant meteor showers ever witnessed, if hopes of astronomers are fulfilled. Our planet is due to cross this heavenly highway the night of Oct. 9-10.

The earth will come within 135,000 miles of the path taken by the faint Giacobini-Zinner comet. It will pass the comet's orbit just eight days after the comet itself speeds by the celestial intersection.

One of the most remarkable of meteor showers startled the world on Oct. 9, 1933, when the earth crossed this same highway in the heavens. When the shower was at its height, as many as 350 meteors an hour flashed across the heavens. One observer actually counted 22,500 falling stars within five and a half hours. This historic display was caused by the same comet that has again been spotted in the heavens.

The earth 13 years ago was about 500,000 miles from the comet's orbit, almost four times as distant as it will be this October. The comet preceded the earth by 80 days, not eight days as in the present case. That is why the shower this year may be even more remarkable than the 1933 Giacobini shower.

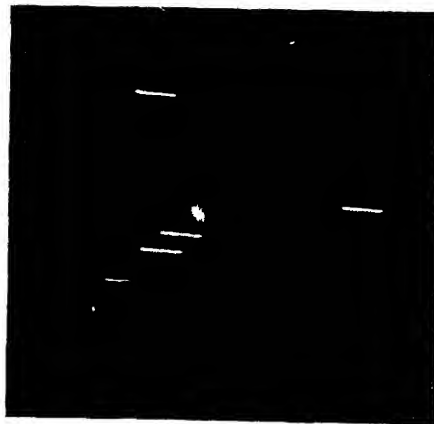
But astronomers are reluctant to risk too positive predictions. Dr. Fred L. Whipple of Harvard Observatory, a world authority on meteors, cautions: "No certain prediction can be made concerning the magnitude of any meteor shower." He remembers sadly the vast hopes built up concerning the expected great shower of Leonid meteors in 1899, an event that disappointed both astronomers and the public.

"The watch for a shower of meteors is similar to a day's fishing trip," states Dr. Leland E. Cunningham, comet enthusiast at the University of California.

"A fisherman knows that fish are somewhere about, but cannot know ahead of time whether he will catch any of them. So it is with meteors: we know there will be myriads of cosmic specks near the earth on Oct. 9, but we don't know whether they will come close enough for the earth to 'catch' some of them in its atmosphere and make them flash as meteors."

"Meteor streams are too erratic in behavior for me to dare promise a great shower," warns Dr. Charles P. Olivier, director of the Flower Observatory and president of the American Meteor Society. "The chances do seem excellent, however, and it would be unforgivable to miss what may well be the best shower of the century through carelessness or unpreparedness."

Rediscovery of the Giacobini-Zinner comet late in May by Dr. Hamilton M. Jeffers of Lick Observatory, Calif., set the stage for the celestial fireworks this fall. The comet was located close to the position previously calculated for it by the British astronomer F. R. Cripps. When spotted, the comet was of the seventeenth magnitude, far too faint to be seen with the unaided eye or even through a small telescope. Since then,



SKY-STREAKER—The Giacobini-Zinner comet, now visible and responsible for the expected meteor shower on Oct. 9, was photographed by B. P. Sharpless of the U. S. Naval Observatory.

however, it has brightened until it is now about ninth magnitude.

Discovered in 1900 and recovered in 1913, the comet takes about six and a half years to travel around its orbit. But only when its journey brings it to the vicinity of the earth so that our planet runs into its celestial dust, as in 1933 and again this year, is there a good chance of a spectacular meteor shower.

It is then that many tiny bullets from space burn up through friction after they enter the upper layers of the earth's atmosphere. Some are pea-sized, others are no larger than grains of sand. They usually flare up about 70 miles above the earth's surface and disappear about 50 miles above.

Observers stand the best chance of witnessing a spectacular display sometime during the night of Wednesday-Thursday, Oct. 9-10, estimates Dr. Cunningham, who has made involved calculations on the comet's orbit. Nevertheless the possibility of a shower's occurring after midnight on Oct. 8-9, or on the evening of Oct. 10 should not be overlooked.

Earth Within 500,000 Miles

The earth will be within 500,000 miles of the comet's orbit, the distance it was during the spectacular shower in 1933, from 7:30 a. m., EST on Oct. 9 until 11:30 a. m., EST, Oct. 10. A shower should occur any time during this interval, or even during several hours before or after, so look for it on the three successive nights.

If the shower does occur as scheduled, meteors will be seen in all parts of the sky. The "shooting stars" will seem to radiate, like the ribs of an umbrella, from a point called the radiant, near Nu Draconis, the head of Draco, the dragon. At about ten o'clock in the evening, local time, this constellation will be in the northwest, about two-thirds the way up from the horizon. (See diagram, page 197.)

Although called "falling stars," the meteors will fly in all directions, even upward. Those nearest the radiant will have the shortest apparent paths, and a meteor exactly at the radiant will seem stationary, simply appearing and vanishing without apparent motion. Meteors further away will flash greater distances across the heavens.

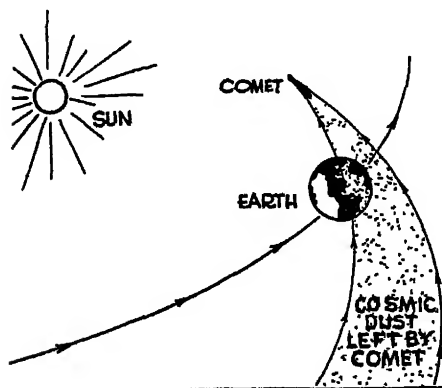
The moon, unfortunately, will be nearly full. Under a full moon most of the faint meteors seen in 1933 would not have been noticed. In watching for these meteors, avoid the glare of the moon and look toward the north, away from its bright disk.

In 1933 the brilliant shower was visible for only a few hours for people in Europe; the earth had plowed through the cosmic debris before darkness came to America. This time the meteoric display is expected to be at its height for people in America. But, the majority of the meteors were faint last time, only about one in twenty being of the first magnitude or brighter; likewise this year the majority probably again will be quite faint. To see the full glory of the shower, you should be in the open country, far from city lights.

Count Shooting Stars

Amateurs can help by sending reports of the meteor shower to the American Meteor Society, at the Flower Observatory, Upper Darby, Penn. Just count the number of "shooting stars" you see during ten-minute intervals. Dr. Olivier, president of the society, suggests you report the exact minute of starting and stopping to count, the direction in which you were facing, your exact location and whether the sky was clear or cloudy. Be sure to give your name and address.

Each person should count all the meteors he actually sees, whether seen by others or not. If you are an old hand at counting meteors, you might at least once each hour spend ten minutes counting the meteors of each magnitude. If



COSMIC DUST—A meteor shower is caused by the earth's plowing through a stream of cosmic dust such as that believed left by a comet.



FALLING STARS—Spectacular Leonid shower of 1833, so dense that thousands of meteors were seen in a single night, is pictured by a contemporary artist.

you have low-power binoculars or a comet-seeker available, determine the number of meteors of various magnitudes seen through such instruments.

If the shower comes up to expectations, a number of shooting stars may be caught on a photograph. Although a meteor streaking across the sky is only occasionally captured on a film, a photograph taken during the recent historic shower showed the record number of 26 faint meteor trails near the great star Vega.

For Clear Photograph

To get a clear photograph, place the camera in a fixed position, facing it away from the moon, which is far from the radiant, and set the head of Draco on the edge of the field of vision. Beware of haze. Estimate how long your camera can be open without fogging—this will probably be a half hour at best. Record each time of opening and closing the shutter.

The stars, instead of appearing as bright dots, will leave slightly curved trails on the film. If you do "catch" a

meteor, you will have no trouble in identifying it—the meteor will show up as a long, straight line, probably cutting across the paths taken by the stars. The American Meteor Society hopes that particularly good pictures will be sent in.

Meteor Swarms

Meteor swarms move in elliptical orbits, encircling the sun in a gigantic necklace of cosmic debris. Many meteor swarms follow the same orbits as those of known comets. This shower offers an excellent opportunity for testing the relationship between comets and meteors.

Are the tiny solid particles more or less uniformly spread out behind the comet along its orbit, being thicker near the comet and thinning out at a distance behind it? Or does the heavenly dust and gravel occur in bunches with nearly clear gaps between? Only by studying many meteor showers closely associated with comets can we hope to answer such questions.

But debris that may be following the comet's orbit exactly at some particular

(Turn to page 204)

Do You Know?

About one out of every seven *jobs* in America is made by the automotive industry.

Although *diabetes* can be controlled by use of insulin, scientists as yet know of no way to prevent this disease.

The *scales of herring*, caught in Canadian waters, are the source of "pearl essence", used to make artificial jewelry, knife handles and dresser sets.

So rich in *carotene* are carrots that even the name "carotene" is taken from them; in the human body, vitamin A is made from carotene.

The first use of *coal* as a common fuel in the world is probably recorded in the Saxon Chronicle of Abbey of Peterborough in 862.

The use of radioactive "*tracers*" to study living physiology dates as far back as 1922 when Hevesy of Denmark studied in this way the uptake of lead by living plants.

A mysterious *disease*, killing Italian chestnut trees, threatens the supply of chestnut flour which has been saving part of the Italian population from starvation during the food famine.

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From Page 203

time will probably not continue to do so forever, cautions Dr. Cunningham. This is because the orbits of most short-period comets pass quite close to Jupiter's path and sooner or later the comet and planet will be almost together in space.

When that happens, Jupiter will alter considerably both the comet's orbit and that of the tiny particles that become meteors when entangled in the earth's atmosphere. But Jupiter will probably not pull both the comet and the debris an equal distance from their paths. Thus after such a close encounter with Jupiter, the meteors will no longer exactly follow the comet's orbit.

The comet's orbit cannot be used exactly to predict when the earth will run into the cosmic dust. Nor can we observe the meteors in space—they must strike the earth's atmosphere before any brighten. That is why astronomers, though hoping October will bring us a very spectacular meteor display, are unwilling to go out on a limb and definitely predict such a shower.

Science News Letter, September 28, 1946

MEDICINE

Don't Neglect Ear Aches

➤ WITH the season for football, colds and many childhood diseases getting started, parents need to remember the effect these may have on a child's hearing and be alert to prevent any hearing loss from them. The usual parental worry over football is for broken bones, dislocations and serious sprains. The Indiana State Medical Association calls attention to another cause for concern. Lifetime damage to hearing, it points out, may result from a broken nose in a grade school football game that is not properly cared for. Nasal passages could grow together, keeping air from the ear with resulting loss of hearing.

"Any slight ear ache," the medical association warns, "should mean a trip to the doctor. Medical supervision of all ear troubles and of all communicable diseases which are known to affect the hearing is imperative. Children should be kept under strict care when they have a cough or cold or sore throat. And they should be immunized against all communicable diseases for which there is any protection.

"How to blow their nose properly is something they should be taught. Their ears should be protected in swimming

BACTERIOLOGY

Germs Get Resistant To Streptomycin

➤ "RAPID DEVELOPMENT of extreme resistance to streptomycin" by various germs is reported by a group of Boston physicians in the *Journal of the American Medical Association* (Sept. 7).

The physicians are Drs. Maxwell Finland, Roderick Murray, H. William Harris, Lawrence Kilham and Manson Meads of Harvard Medical School and Boston City Hospital.

In eight out of 12 patients with urinary tract infections, the infecting organisms developed resistance to streptomycin so rapidly that the antibiotic drug failed to help the patients.

Germ resistance to this drug, it is pointed out, may be of "considerably greater importance" than the resistance that develops to sulfa drugs and penicillin.

Science News Letter, September 28, 1946

and diving, and parents should never put any medicine in young ears unless a doctor orders it.

"Frequently loss of hearing is so slow that parents may not suspect anything for years and think the child is absorbed in play or just inattentive. Indiana and many other states require periodic hearing tests of school children. Reports on these tests should be followed up by parents for it is their responsibility to avoid as much damage as possible. Early diagnosis and treatment of hearing loss are vitally important."

Science News Letter, September 28, 1946

INVENTION

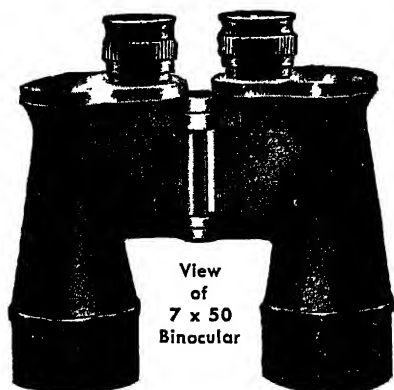
Soapless Soaps Come In Bar Form Now

➤ SOME OF the new "soapless soaps", hitherto available mainly in powder form, are combined with ordinary soap so that they can be pressed into orthodox soap bars for toilet and bath use. John W. Bodman, research director for Lever Brothers Company, has assigned to this firm rights in his patent, No. 2,407,647.

Science News Letter, September 28, 1946

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| 6164-Q* | 26 | 104 | .80 |
| 6168-Q* | 29 | 76 | 1.25 |
| 6171-Q* | 32 | 171 | 1.00 |
| 6173-Q* | 34 | 65 | 1.00 |
| 6176-Q* | 38 | 181 | 1.00 |
| 6177-Q* | 39 | 63 | 1.10 |
| 6178-Q* | 45 | 189 | 1.50 |
| 6179-Q* | 46 | 78 | 1.25 |
| 6182-Q | 27 | 51 | 1.25 |
| 6183-Q | 44 | 189 | 2.50 |

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| 3053-Q | Right Angle | 70 mm. | 168 mm. | 3.00 |
| 3001-Q | Lens Surface | 20 mm. | 14 mm. | 2.00 |
| 3006-Q | Porro-Abbe | 9 mm. | 9 mm. | .25 |
| 3009-Q | Porro | 52 mm. | 25 mm. | 1.00 |
| 3029-Q | Dove | 18 mm. | 65 mm. | 1.25 |
| 3036-Q | 80 Degree Roof | 60 mm. | 36 mm. | 4.00 |
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| 709-Q | Amber | 5 7/8" | 1.00 |

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| 3006-Q | Porro Abbe Prism | \$0.25 each |
| 2024-Q | 10 Pieces Circular A-1 Plate Glass (Dia. 31 mm.—for making filter) | .25 |
| 3021-Q | Amici Roof Prism (3rd grade) | .25 each |
| 523-Q | Six Threaded Metal Reticle Cells | .25 |
| 624-Q | Neutral Ray Filter size 4 1/4" x 2 1/4" | .25 |
| 3022-Q | Round Wedge 65 mm. dia. | 5.00 each |
| 16-Q | Level Vial, 48 mm long | .20 each |
| 1040-Q | 6 Power Magnifier—diam 25 mm. | .25 each |
| 2036-Q | Standard Crossline Reticle—diam 29 mm. | .50 each |
| 1034-Q | Burning Glass Lens | .25 each |
| 535-Q | Small First Surface Mirror | .30 |
| 3003-Q | Amici Roof Prism with Corrected Roof | 2.50 |
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ASTRONOMY

Six More Heavyweight Stars Known to Exist

➤ **SIX MORE** ton-per-cubic-inch super-dense stars are now known to exist in the universe, raising the total discovered to 24.

Two American astronomers, Dr. W. J. Luyten of the University of Minnesota and Dr. P. D. Jose of Tucson, announced the discovery of the additional white dwarf "degenerate" stars, in connection with celebration of the 75th anniversary of the founding of Argentina's national observatory at Cordoba.

The new champion heavyweight stars were discovered during an astronomical photographic survey with the 36-inch Steward reflecting telescope of the University of Arizona.

The white dwarf stars are the least visible compounds of some double star systems. The companion of Sirius was the first white dwarf star discovered. A cubic inch of the companion of Sirius, brought to earth, would weigh a ton. The material of these small, hot stars is so tightly packed together that they are in some cases hundreds of times as dense as water.

Science News Letter, September 28, 1946

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**Time for Pruning**

➤ **AUTUMN** is the time for pruning, which is all the surgery most trees should need. Indeed, if you have the care of a tree from its youth onward, simple pruning is all the care it will require to prevent the disastrous heart-rot that would later necessitate a visit from the expensive tree surgeon with his chisels and concrete fillings. The fungi and other micro organisms that cause this rot invariably invade the tree through some untended wound where a branch has been broken or improperly cut off, leaving a naked stub open to their insidious attack.

The right way to cut a branch off a tree is to set your saw just as close to the line where it joins the trunk as possible. But don't saw straight downward, parallel with the trunk. That will leave too large a wound, which will take too many years for the bark-growth to heal. Cut outward at a very slight angle, so as to go as squarely as possible across the diameter of the branch itself. That will leave a slight hump, but not unsightly, and in a few years the bark will have grown completely over it and no one will notice it at all. The right way to prune is shown on the right, in the sketch.

The way a branch should never be sawed off is shown on the left. It takes a very long time for the bark to shove its edges over the end of a stub like this. Frequently the bark will die back to the trunk instead, leaving the rotting stub as a sure highway for invasion by rot fungi.

While you are making your cut, be very careful to support the branch, lest its weight break it off before you have

finished, thereby tearing a long strip of bark and perhaps a splinter-gash into the wood itself. Wounds of this kind are nasty, again invitations to fungi, and in any case unsightly until they have healed. If your branch is a large one, better undercut it a few inches out before starting your main cut. Then if it does break off it will do no harm.

After you have your branch cleanly cut off, brush away any sawdust and bits of bark that may be clinging to the face of the cut and paint it immediately. A little later give it a second, and even a third coat. This is the best way to keep out decay organisms. Ordinary house paint is good enough, but best of all is a good, flexible, weather-resistant asphalt paint.

Science News Letter, September 28, 1946

INVENTION

Cotton Harvester Strips Staple from Plant

➤ **ANOTHER EFFORT** at the mechanical harvesting of cotton is represented in patent 2,406,058, granted to Claud T. Boone, Sr., of Dallas, Texas. Mr. Boone's machine is technically not a picker but a stripper. On either side of a tractor are mounted a pair of sloping rollers with knurled surfaces, geared to turn in opposite directions, and fitted with guides to lead the cotton plants between them. The rough surfaces of the rollers pull off the cotton, as well as a certain amount of foliage. This is doffed by a pair of spiral conveyors immediately alongside, which carry the cotton back to a following trailer.

Science News Letter, September 28, 1946

PHYSICS

Sound Waves Detect Flaws, Aid Welders

➤ **USING SOUND** waves to detect flaws in the edges of metal plates, a supersonic reflectoscope is being used to determine plates suitable for welding.

The Sperry supersonic reflectoscope, developed by University of Michigan engineers, sends sound waves into plates to be welded. The time of reflection of these waves reveals flaws in the plate.

Welding engineers of The Babcock and Wilcox Company declare the reflectoscope is the only non-destructive method for testing plates before welding.

Science News Letter, September 28, 1946

RADIO

Fluorescent Lighting May Affect Radio Reception

► IF YOU are using fluorescent lamps in your home, your radio reception may be poor, Dr. L. F. Shorey of the University of Vermont told the Illuminating Engineering Society meeting in Quebec. However, the remedy is relatively simple, he said, by using wire-mesh shades and an electric filter.

Dr. Shorey, together with S. M. Gray of Sylvania Electric Products, Inc., presented a paper on a study of radio interference caused by fluorescent lamps in the home. Their report discusses how such interference is measured and reduced below a tolerable noise level.

Total interference, they said, results from three sources; feedback through the wires of the house circuit; radiation of the high-frequency current components from the wires; and radiation coming directly from the lamps.

Line feedback is reduced by the use of an electrical filter, while bulb radiation interference is reduced by the application of a wire-mesh screen built into the lamp shade.

"By a proper combination of these two schemes," they declared, "total interference is suppressed to a quite satisfactory level even with small distances separating the lamp and receiver antenna."

Science News Letter, September 28, 1946



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Books of the Week

BE GLAD YOU'RE NEUROTIC—Louis E. Bisch, Ph.D.—*McGraw-Hill*, 230 p., \$2 50.

This book is intended to give you a new insight into yourself, your intimates and associates—no matter how well you think you know them already. A test by the author is supplied in the book so that you can find out just how neurotic you are.

THE CONTROL OF VENEREAL DISEASE—R. A. Vonderlehr, M.D. and J. R. Heller, Jr., M.D.—*Reynal & Huchcock*, 246 p., \$2.75.

A report to the general public on the history of venereal disease and its control in America and the American armed forces during the war years.

DENTISTRY: An Agency of Health Service—Malcolm W. Carr, D.D.S.—*Commonwealth Fund*, 219 p., tables, \$1 50.

This book presents a comprehensive picture of dentistry in the United States, its history, training, present activities and problems, and some indication of future trends.

EDUCATION IN COLOMBIA—John H. Furbay—*Government Printing Office*, 111 p., tables, illus., paper, 25 cents.

Federal Security Agency, U. S. Office of Education Bulletin 1946, No. 6.

EDUCATION IN COSTA RICA—John H. Furbay—*Government Printing Office*, 62 p., tables, illus., paper, 15 cents.

Federal Security Agency, U. S. Office of Education Bulletin 1946, No. 6.

EVERYDAY AUTOMOBILE REPAIRS—William H. Crouse—*McGraw-Hill*, 296 p., illus., \$3.00.

Written in simple, non-technical language, this book provides basic material on the operation of the automobile, explains what troubles may occur, and then shows you how you can diagnose and correct them yourself.

MODERN MUSIC—Max Graf—*Philosophical Library*, 320 p., \$3 00.

This book deals with the development of the music of the twentieth century. Leading personalities in the music world of our era, composers and musicians alike are brought to life in the chapters.

INVENTION

Plastic Coating Makes Better Work Gloves

► WORK GLOVES, made of plastic-coated fabrics, are promised for the near future. Much of the glove is Canton flannel, but the thumb, index finger and palm-surface are covered with vinyl butyral, a tough, flexible plastic made by the Monsanto Chemical Company, that gives protection similar to leather.

The plastic coating is washable. Grease, oil and grime can be removed with a solvent. The gloves will be made by regular glove manufacturers, Monsanto furnishing the plastic. This coating material has good wearing qualities and gives a good trip. The gloves coated with it will sell in the ordinary price-range of work gloves.

Science News Letter, September 28, 1946

A NEW CARNIVOROUS DINOSAUR FROM THE LANCE FORMATION OF MONTANA—Charles Gilmore—*Smithsonian Institution*, 19 p., plates, paper, 25 cents.

Smithsonian Miscellaneous Collections, Vol. 106, No. 13, Pub. 3857.

THE NEW SCIENCE OF SURGERY—Frank Slaughter, M.D.—*Julian Messner*, 286 p., \$3 50.

The story of the conquest of shock, pain, and infection—the revolutionary achievements of our wartime surgeons, achievements that will mean life and health for millions who would have faced only pain and death ten years ago.

THE NONMARINE MOLLUSKS OF SAN JOSE ISLAND, WITH NOTES ON THOSE OF PEDRO GONZALEZ ISLAND, PEARL ISLANDS, PANAMA—J. P. E. Morrison—*Smithsonian Institution*, 49 p., plates, paper, 30 cents.

Smithsonian Miscellaneous Collections, Vol. 106, No. 9 Pub 3850.

THE TREATMENT OF BRONCHIAL ASTHMA—Vincent Derbes, M.D., and Hugo Engelhardt, M.D.—*Lippincott*, 466 p., tables and illus., \$8 00.

A book giving practical, workable information on how to diagnose and treat those troublesome asthmatic disorders seen in daily practice.

Science News Letter, September 28, 1946

Narcotics & Drug Addiction

By Erich Hesse, M.D.

All the pleasure drugs of our time, methods of production, addictions and cures—are completely described in simple, understandable language, including MORPHINE, COCAINE, HEROIN, SOPORIFICS, ALCOHOL, OPIUM, INTOXICATING PEPPER, HASHISH, LAUDANUM, RARE ADDICTIONS, Etc.

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• New Machines And Gadgets •

☼ **TOASTING FORK**, for outdoor cooking over bonfires or barbecue grills, has three tines on one end of a long stainless steel shaft, and a small crank on the other. Between is a tube to enclose the shaft and use as a holder. Turning the crank rotates the cooking food over the fire.

Science News Letter, September 28, 1946

☼ **WOOL OR HAIR** treated with a newly patented process in which formamidinesulfonic acid is employed undergoes certain physical and chemical changes. The shrinkage tendency of the wool and its disagreeable odors are decreased. With hair, it has value in permanently waving, curling and deinking.

Science News Letter, September 28, 1946

☼ **HIGH-FREQUENCY** induction heater, that widens the scope of electronic heating, is in a steel cabinet less than four feet square. It can be used for brazing, soft soldering, fusing, hardening, annealing, tempering, as well as for other purposes. It has two water-cooled oscillators and six rectifiers.

Science News Letter, September 28, 1946

☼ **PACKAGE OPENER**, a kitchen tool to cut the edges of cardboard food containers, has two flanged parts angled with each other so that they fit the corner of the package. Centered between them is a sloping razor blade that cuts as the device is drawn forward on the container edge.

Science News Letter, September 28, 1946



☼ **METAL LOCATOR**, to spot metallic foreign substances within the body, indicates the presence and orientation of the metal by visible and audible means. A primary coil creates an alternating magnetic field about a probe, shown in the picture. Any hidden magnetic metal causes a current change in a secondary coil.

Science News Letter, September 28, 1946

☼ **ELECTRIC** fly screen with a new-type transformer consists of two pairs of sturdy bars, spaced $\frac{3}{8}$ inches apart, supported in a metal frame. The transformer delivers enough electricity to the bars to kill insects trying to pass through, but not enough to affect larger animals.

Science News Letter, September 28, 1946

☼ **PORTABLE** mortising tool, developed and used in Germany, applies a chain saw principle in cutting a mortise to make joints in pieces of lumber. It is mounted on two steel posts and slides up and down when cutting. The power-driven tool can make a mortise cut five inches deep.

Science News Letter, September 28, 1946

☼ **RAZOR BLADE** holder is made of a single piece of springy wire bent to hold a blade by the notches on its ends, with the open ends of the wire for the handle. A cross section, placed under the blade to form a guard, is obtained by bending the wire forward at each rear corner.

Science News Letter, September 28, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin #10. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

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Question Box

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What are astronomers looking forward to on Oct. 9? p. 202.

Why will Venus not be good to observe in October? p. 197.

CHEMISTRY

How can the essence of apples be saved? p. 200.

MEDICINE

What should be done about an parachute? p. 204.

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RADIO

How does fluorescent lighting affect radio reception? p. 207.

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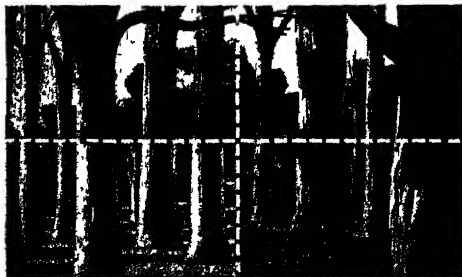
THE WEEKLY SUMMARY OF CURRENT SCIENCE • OCTOBER 3, 1963



A SCIENCE SERVICE PUBLICATION



DO YOU KNOW? In a year, plywood made with Monsanto glues could form a "ribbon" four feet wide and three-ply thick, circling the globe nearly twice. World's biggest plywood glue producer is Monsanto's subsidiary, I. F. Laucks, Inc., "America's Glue Headquarters."

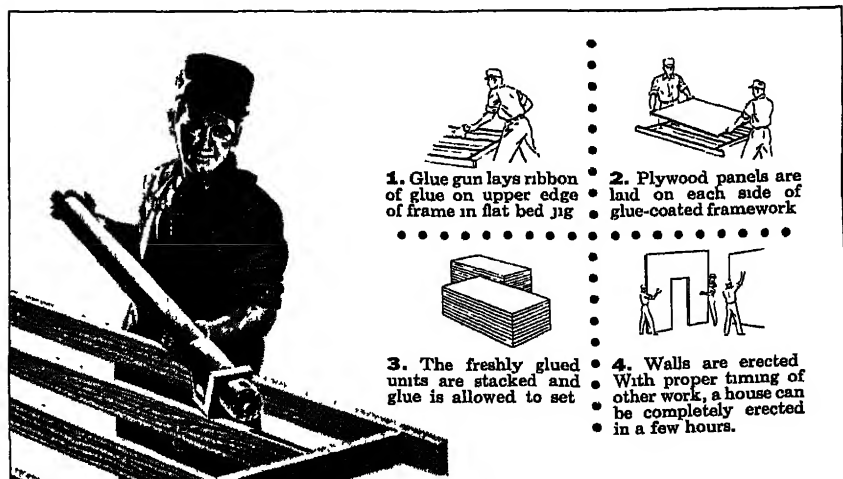


DO YOU KNOW? Modern glues make possible the salvage of one-fourth of our salable forest resources which would otherwise be wasted. Scrap timber which formerly went to the burners now goes to the glue room in modern mills... is edge-glued, patched or jointed into first-grade stock, stronger than the equivalent one-piece material.

If you've thought of glue only as an evil-smelling substance which the "fix-it man" uses for minor household repairs... think again. Come, join our 5-minute Quiz Program!

Research-developed glues — products of Monsanto Chemistry — serve you in far more ways than you may suspect.

They bond into a single, rugged pane the three-decker "sandwiches" of wood and glue that you know and use as plywood... and they can hold together not merely your kitchen chair, but also vital parts of your new home, your private plane, your pleasure boat, scores of new and better products you'll own tomorrow.



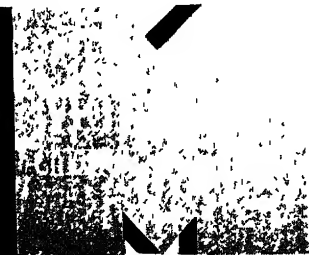
DO YOU KNOW? In at least *twenty* places the modern glue gun can replace the old hammer-and-nails method in building construction, laying a ribbon of glue silently and swiftly. Sketches above show

how walls of plywood (*glued*, not nailed to stud-ding) provide modern prefabricated or plasterless construction with speed and economy—8.6 times stronger than conventional walls.

What's YOUR Problem?

If you make *anything* which has to be assembled, why not check up on the possibilities of a glue "tailored" to your exact needs. Inquire at "America's Glue Headquarters"... I. F. Laucks, Inc., Seattle, Washington, or the Laucks or Monsanto sales office nearest you. And remember, construction and plywood glues are only a few of the many hundreds of chemical and plastics products made by Monsanto Chemical Company.

SERVING INDUSTRY... WHICH SERVES MANKIND





NOBELISTS AT PRINCETON—When Princeton University opened with nuclear physics sessions, an academic year of bicentennial observance, looking forward to its third hundred years, 12 Nobel prize winners were present. The five shown in this photograph are (left to right): Dr. Arthur Compton, president of Washington University; Dr. Niels Bohr, Danish physicist; Mme. Irene Curie-Joliot of Paris; Prof. Manne Siegbahn of Stockholm and Prof. P. A. M. Dirac of University of Cambridge, England.

PHYSICS

Princeton Bicentennial

Scientists discuss new explanation of the interaction of light and electrons. Such theories may lead to greater understanding of cosmic rays.

Princeton's bicentennial conferences are notable events and highlights of the first two are presented in this issue.

➤ A NEW explanation of science's most fundamental relationship, the way in which light interacts with electrons, the particles of electricity, was presented to the world when Dr. P. A. M. Dirac of the University of Cambridge, England, spoke at the Princeton Bicentennial Conference on Nuclear Science.

Dr. Dirac told how a combination of Einstein's special relativity theory and the Heisenberg uncertainty principle gives hope of explaining the way in which two electrons get together by passing between them a bundle of light that scientists call a photon.

In his audience of about 50 was Dr. Niels Bohr, the Danish atomic scientist, as well as other world leaders in atomic studies.

Despite the world-shaking consequences of atomic physics, scientists have not been able to figure out vigorously and precisely the relationship of two electrons, the smallest bits of matter, even when only the simplest and most classical conceptions are included.

Dr. Dirac explained that his latest solutions of what is called "the quantum theory of electrodynamics" give mathematical results that predict what is discovered by experiments without resort-

ing to arbitrary rules in the mathematical developments.

Such complex equations may seem theoretical and remote, but in them there may be the beginnings of new understanding of cosmic rays, of interplay between the constituents of atoms of new phenomena that promise new industries and new weapons for the future.

The importance of having a good method of solving what happens when two electrons interact extends far beyond this simple case. It is the first step to understanding what happens when the cores of two atoms interact. The clash of atomic nuclei powers an immense amount of human endeavor including atomic energy.

By use of analogy, with a dash of intuition, the theory concerning simple electrons is being applied to atomic hearts to explain their interaction. Just as packets of light are connections to the electrons, there is a possibility that the meson particles discovered in cosmic rays are the means of interchange between the constituents of atomic nuclei.

The idea that there are regions of the universe very close to the cores of atoms where rules that are good in the larger spaces outside do not apply was recalled into the scheme of things by Dr. Dirac. This is a sort of "two worlds" type of physics that seems to be necessary to

make theory work and most physicists are no more happy about it than the advocates of one world in the present international situation.

As stated by Dr. R. P. Feynman, young theoretical physicist from Cornell, who discussed the Dirac paper, studies of the cosmic rays being pushed by V-2 rockets and B-29 flights promise to give facts that can be applied to deciding what mathematical pictures of the atomic world are correct. From new experimental high voltage generators being built in several American laboratories, more information will be obtained. They will duplicate the energies of the cosmic rays under experimental control.

The new 184-inch cyclotron at the University of California will also make possible the discovery of many more artificially radioactive isotopes of chemical elements in addition to the 450 now known. Dr. Glenn T. Seaborg, discoverer of the atomic bomb element, plutonium, told the conference this new atom smasher, to begin operating this fall, will generate heavy hydrogen particles of 200,000,000 electron volts and helium ions of 400,000,000 electron volts.

Science News Letter, October 5, 1946

GENERAL SCIENCE

Research Must Be Free For Scientific Progress

➤ FREEDOM to do scientific research and tell the world about it is an appealing ideal difficult to achieve, to judge by the conversation and papers during the three days of the Princeton Conference on Nuclear Science.

Leaders in atomic bomb research have found that because the National Atomic Energy Commission has not yet been appointed the lid is more firmly closed on fission research than at any time since shortly after V-J Day. The law passed by Congress put all new researches under wraps, with severe penalties, unless the commission exempts them specifically.

The situation will be relieved without doubt when the commission organizes, but for the present even some of the close cooperation with the British scientists within the Manhattan Atom Bomb Project has had to be suspended since Aug. 1.

Some scientists expressed considerable worry over the large amounts of money being given universities by the Navy and War Departments for research, even in fields somewhat remote from war

weapons. There are no formal strings on much of this money, but some fear the implied obligations may be hampering.

Many agreed with the only woman scientist among the delegates, Mme. Irene Curie-Joliot, who with her husband and with her winner of the Nobel Prize, dominates France's atomic energy commission. Mme. Curie-Joliot expressed doubt that it would be possible to teach students and work in a university if any of the work done had to be kept a state secret.

Control of science by some central authority is another great fear expressed. The war brought severe control of research applied to war needs in this country, and Soviet Russia is always cited as an example of state planning in science.

One of the two Russians at the conference, Dr. M. G. Mescheryskov of the Leningrad Radium Institute, stressed in an impromptu statement that "creative processes are understood throughout the world to be free and independent." He

felt that the existence of a common philosophy of nature, equally correct in Russia, China, England or the United States, was a hopeful, unifying sign. To pit Russian ideology against Western ideology on the question of freedom of science is without factual foundation, he argued.

Freedom for each scientist to work on any problem he desires was justified by Prof. M. Polanyi of the University of Manchester, England, on the grounds that this is the most efficient method. No important investigation would be neglected, he suggested, and new scientific knowledge would grow at the fastest possible rate, provided everyone told what he discovered.

Directors of industrial research laboratories, Dr. C. E. K. Mees of the Eastman Kodak Company stated, find that at least a partial freedom of science within their walls pays research dividends. Scientists given their head are more productive of new and fundamental ideas.

Science News Letter, October 5, 1946

GENERAL SCIENCE

Science Guides Thinking

Ideas should be connected with science to solve international problems without another World War. Scientific method is of use in all fields.

► BY CHANGING our thinking about economics, politics, religion and ethics so as to connect them with scientific knowledge and methods, it might be possible to bring Soviet and American philosophies together and prevent another World War, Dr. F. S. C. Northrop, Yale philosopher and author of "The Meeting of the East and West," told the Nuclear Physics Conference of the Princeton Bicentennial.

Classical democracy such as rules the British-American world today, Dr. Northrop explained, goes back to the ideas rising out of Kant's philosophy based on Galileo and Newton, which separated science and man. This abstract hot-house brand of moral philosophy argued that science could solve none of the problems of man.

Ideas more nearly related to the Greek conceptions are favored by Dr. Northrop, who said that our present needs for controlling atomic energy and other technological developments can only be met by "a humanism rooted in the ideas of verified scientific theory and sensitive to the possibilities and inevitabilities which

the application of this scientific theory bring."

Dr. Northrop would take scientific theory, arising out of deductions connected with experiments, and combine it with the basic methods of logical analysis in science to provide concepts of use in all fields of human endeavor.

This would tell what is right in law, good and divine in morality and religion, useful and effective in economics and politics as well as give a means of controlling science, including atomic energy, to good social ends.

In such ideas as Dr. Northrop proposes there may be an approach to the highly explosive dilemma in the international situation. The basic ideology of communism which controls much Soviet thinking and action could be adapted to evolve into a scientific humanism. If, in turn, our scientists and diplomats could modify their viewpoints and basic modes of thinking and conduct to conform with the new science-grounded philosophy, they might be able to join in a philosophical or ideas conference that would achieve a satisfactory code of in-

ternational conduct. There might come as a result control of the atomic bomb and world affairs without another war.

Science News Letter, October 5, 1946

INVENTION

Ultraviolet Lamp Sterilizes Air

► AN ULTRAVIOLET lamp for sterilizing the air in food display cabinets, and at the same time illuminating them, is covered by patent 2,407,379, issued to Walter B. Morehouse of Auburndale, Mass. A part of the tube is coated with a phosphor, to be excited to luminescence by the bactericidal rays.

Science News Letter, October 5, 1946

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PHYSIOLOGY

Bikini Ark Returns

USS Burleson brings animal survivors for study of the effects of exposure to atomic radiations. Blood transfusions and penicillin are best combatants.

See Front Cover

► DETAILED data on the biological effects of atom-bomb radioactivity, and on medical means developed for combating them, will be kept as military secrets, Vice-Adm. W. H. P. Blandy stated in response to a question at a press conference held on board the USS Burleson, with the animal survivors of the Bikini tests aboard.

There is no objection, he added, to disclosure of general results, which he and other officers discussed freely. The prime reason for exposing animals to the deadly effects of the two bombs, Adm. Blandy emphasized, was to obtain information useful to physicians; there was no "pure science" objective at all.

Best Combatants

Best known means for combating bad after-effects of exposure to atomic radiations are blood transfusions and penicillin, stated Capt. R. Harold Draeger, who was in charge of all animal experimentation at Bikini. A Bikini goat taking a transfusion is shown on the cover of this SCIENCE NEWS LETTER. These are to offset anemia and combat infection. There is no way yet known to attack the direct results of the harmful irradiation.

Sterility due to radioactive effects of the bombs on the animals remains somewhat of a moot point. The sex glands of some of the male animals exposed to the rays seem to have become somewhat atrophied. On the other hand, mice that were in the outer part of the test area, but still within range of the rays, have been actively reproducing.

One result of an all-out atom-bomb war might be to leave a world populated with rats and insects. For rats are considerably more resistant than humans to the deadly radiations that are perhaps the worst feature of atomic explosions. Insects are even more resistant than rats, stated Capt. Draeger.

As a matter of fact, rats were deliberately chosen for most of the tests for that very reason, Capt. Draeger explained. The Navy's medical men wanted ani-

mals that were more resistant to radioactivity than men, as well as some that were about on the human level, and some that were less so. The goats and pigs had approximately the same sensitivity as man; the guinea pigs were somewhat more susceptible to the evil-working rays.

Insects were not included among the test animals, but researches on them in the past have shown that they are able to survive from 20 to 40 times the dosage of destructive radiation that will kill a man.

Except for the effects of the bombs' radiations, the mice, rats, guinea pigs, goats and pigs that made the Burleson into a scientific Noah's Ark have an excellent record for health. There were no epidemic diseases among them, and they did not become seasick even when some of their two-legged fellow-voyagers did.

When they had to be left alone on the target ships for several days, food and water were left with them. This was

something of a problem in the case of the pigs, because of the chance that they might "make hogs of themselves" and eat everything on the first day. A solution was found, however, by making V-shaped feeding racks with slots just wide enough to admit the end of a snout. These racks were filled with alternating layers of alfalfa hay and grain. With this setup the pigs really had to work for their meals, and did not overeat.

Science News Letter, October 5, 1946

PHYSICS

New Fire, Smoke Detector Makes Use of Ionization

► A NEW type of fire or smoke detector is offered for patent 2,408,051 by K. O. Donelian, of New York. Instead of depending on visual or photoelectric detection of smoke, as in existing instruments, he takes advantage of the fact that a large proportion of the particles produced by combustion carry electric charges, by flowing air drawn through ducts from the spaces to be watched past a pair of electrodes, and registering significant changes of potential. Because some smoke particles are uncharged, he adds a third electrode, plus a small mass of some radioactive material, to impart charges

Science News Letter, October 5, 1946



TEST RAT—Blood oozing from a little nick in this white rat's tail will be collected and used in estimating the effects of the atom-bomb's radiations on the animal's blood-forming tissues. A second rat, on scale at left, awaits his turn.



ELECTRIC MOTOR—Wire coils are being installed in the stationary part of one of the new all steel-encased motors under construction in the Buffalo plant of the Westinghouse Electric Corporation.

ENGINEERING

New All-Steel Motor Packs Greater Power

➤ CALLED the most revolutionary change in construction since the invention of the electric motor 58 years ago, a new all steel-encased motor developed by Westinghouse is revealed. It packs up to 134% more power per pound of weight than previous motors, and is designed to increase the efficiency of machine tools.

The frame for the new motor is made from a single piece of steel rolled into a circle with the ends welded, Leon R. Ludwig, manager of the Westinghouse plant in Buffalo, states. Obviously this frame is stronger than one of cast iron, he declares. The same goes for the bell-shaped covers for each end of the motor.

Keystone of the new motor, he continues, is its flexibility. Focal point of the flexibility centers upon the stator core, the circular stationary part, and the frame assembly. The identical stator core and frame assembly are used regardless of whether the finished motor will be drip-proof, splash-proof, totally enclosed fan-cooled, or totally enclosed non-ventilated.

Science News Letter, October 5, 1946

OPTICS

Sun's Dazzle Eliminated

Telescope-like instrument, icaroscope, reveals afterglow image instead of the sun itself. Phosphor screens are used.

➤ THE DAZZLE of the sun is eliminated when the solar disk is viewed through a new telescope-like instrument revealed to the Optical Society of America in New York. New knowledge of the sun and the surrounding sky may result; secrets hidden by the dazzling brightness may be revealed.

The instrument, described by Dr. Brian O'Brien of the University of Rochester, is called the icaroscope. With it the observer does not see the sun itself but views an afterglow image on a transparent phosphor screen.

Phosphor screens are glass or other material coated with a fine chemical powder that gives off light for a period after being excited by active light radiation and after the source of excitement has been removed. This secondary light is called the afterglow. In this case, the sun is the exciter. The image formed is bright and clear, and has no dazzle. The phosphor used is one whose after-

glow is for a short period only.

In appearance the instrument looks like an ordinary telescope, and is used like one. The phosphor screen is near the eyepiece. Between them, however, is a revolving disk shutter. Between the screen and the telescope objective there is another disk shutter. The two are mounted rigidly on the same motor shaft, with the sector openings out of phase.

Thus the screen is not visible while being illuminated by the sun, but is viewed a half cycle later after the illumination is cut off. This is repeated at the rate of 90 cycles per second so that viewing seems to be continuous.

Dr. Gordon G. Milne, also of the University of Rochester, explained how the icaroscope screen is made. It is a slightly concave disk of glass with a thin layer of phosphor. The finer particles of the powder used are allowed to settle on the disk through a column of liquid.

Science News Letter, October 5, 1946

BIOCHEMISTRY

Proteinogen Suggested

➤ A MOTHER substance of all proteins whether they occur in meat, enzymes, disease-causing virus or disease-fighting antibodies, was suggested to leading biologists and chemists attending the Princeton Bicentennial Growth Conference by Dr. John H. Northrop of the Rockefeller Institute for Medical Research, famed for his pioneer work in synthesis of some of the proteins.

The manufacture in the cells of this substance, christened proteinogen by Dr. Northrop, would allow the subsequent making in the blood of the various kinds of proteins, which are basic materials of life.

The new theory may lead sooner to artificial antibodies for disease fighting. These could be manufactured, instead of made in a living animal or man.

Getting energy into the building process that produces the proteins is provided simply by the new idea. This has been one of the stumbling blocks

in working out how the body builds such materials.

The energy is put into the proteinogen molecule when it is synthesized from simpler chemicals, called amino acids. Then the normal proteins, viruses and antibodies are formed from the proteinogen mother substance without use of any new energy.

A substance made of giant molecules has been found in the blood of young cattle and unborn chickens and this may be proteinogen.

Science News Letter, October 5, 1946

More than nine-tenths of the billions of stars found in the entire sidereal system are located in the Milky Way

Electric light bulbs vary in size from a one-fifth-watt bulb, about the size of a grain of wheat, used in medical instruments, to 10,000-watt lamps, larger than basketballs, used in airport flood-lighting and motion pictures.

MEDICINE

Scientists Describe Cancer Growth Theory

► THE ESSENCE of all cancer comes from cells which nourish the early, embryonic stage of life months before birth. This is suggested by two University of California scientists, Ernst T. Krebs, Jr., and Charles Gurchot, on the basis of studies reported in the journal, *Science*, (Sept. 27).

In attributing all cancers to one factor, the California scientists differ from many other students of cancer who hold that cancer arises from many complex factors.

Finding a female sex hormone factor in the blood and urine of patients, both male and female, with many kinds of cancer led to the belief that cells that nourish the embryo play the important role in cancer.

These nourishing cells are called trophoblasts. They are never found existing harmlessly in the bodies of men or of women except during pregnancy. They produce a sex hormone called gonadotropin. The worst, most malignant cancers yield this hormone in a quantity duplicated only by the trophoblast cells. Less severe cancers yield this same hormone, the California scientists now find.

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NUCLEAR PHYSICS

Postwar Atom-Smasher Has 70,000,000 Volts

► LATEST postwar atom smasher is a 70,000,000-volt synchrotron being built at the General Electric Research Laboratory, Schenectady, N. Y., under a contract with the Navy's Office of Naval Research. The new instrument was described to scientists at the American Physical Society meeting in New York.

The synchrotron, combining features of the betatron and the cyclotron, was first independently proposed by Prof. Edwin M. McMillan of the University of California and the Russian scientist, V. Veksler, and a 300,000,000 electron-volt synchrotron is scheduled to be completed at the University of California early next year.

Dr. Herbert C. Pollock of the General Electric Research Laboratory predicted that the Schenectady synchrotron will be the first in operation in this country. He said the exact output of the machine is unknown, and it may exceed the "conservatively estimated" 70,000,000 volt figure.

Science News Letter, October 5, 1946

MEDICINE

Method Diagnoses Cancer

Electrophoresis machines analyze protein mixtures found in blood. This method also aids in the diagnoses of other diseases.

► A NEW method for diagnosing cancer and many other diseases was announced by Dr. Eric L. Alling of the University of Rochester, N. Y., School of Medicine and Dentistry at the centennial celebration of the University of Buffalo.

The method depends on the fact that dissolved proteins will migrate in an electric field. A technique for using this phenomenon, called electrophoresis, to analyze protein mixtures such as are found in blood was developed about 10 years ago. Its application to diagnosis of disease is relatively new.

The migration of the proteins follows certain patterns. The patterns of blood from a healthy person may differ from those of blood from a sick person.

Among 125 cases of all types of cancerous diseases, Dr. Alling found only one normal electrophoretic pattern.

In some diseases the electrophoretic patterns help in making a diagnosis, but in at least one disease, cancer of

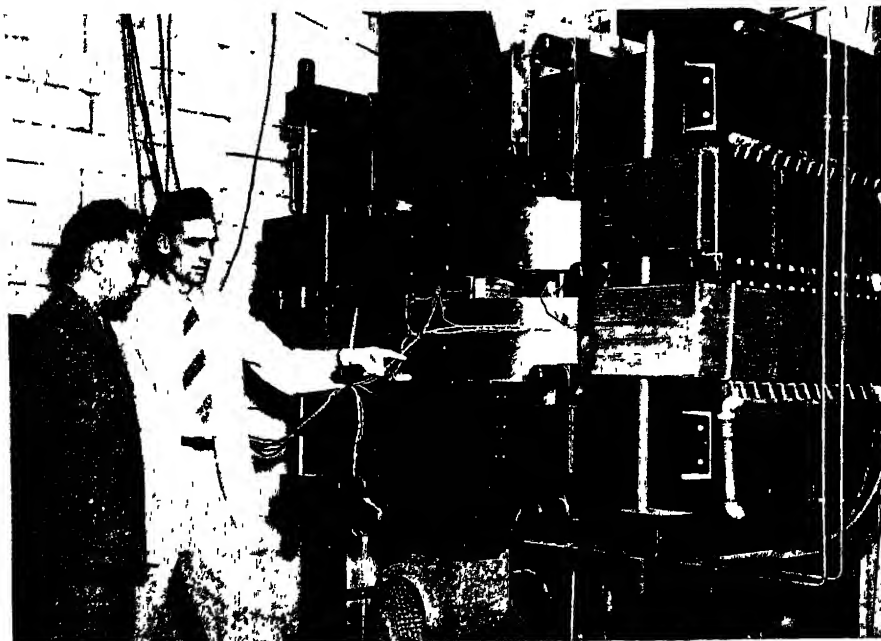
the bone marrow, the diagnosis can usually be made from the electrophoretic pattern alone. In 22 cases of this condition, called multiple myeloma, Dr. Alling has not seen one normal electrophoretic pattern.

Cirrhosis of the liver, hepatitis, acute rheumatic fever, two kidney diseases (nephritis and nephrosis) and Addison's disease are among those for which, Dr. Alling reported, electrophoresis can aid in diagnosis.

Very small irregularities in the peaks of the electrophoretic patterns, Dr. Alling stressed, may be of diagnostic value.

At the present time very few patients will have their blood or other body fluids analyzed by this method to help diagnose their illness because there are less than 40 electrophoresis machines in the United States. Also, Dr. Alling pointed out, it takes three hours to make one determination with this method and no more than two can be made in a day.

Science News Letter, October 5, 1946



ATOM-SMASHER—This synchrotron is nearing completion at the General Electric laboratory in Schenectady, N. Y. It is capable of hurling electrons at energies of at least 70,000,000 volts.

MEDICINE

Arrow-Poison May Be Aid to Anesthesia

➤ A WAY to make curare, the old arrow poison of South American Indians, an aid to anesthesia for surgical operations, is being sought by Dr. Harold F. Chase, assistant professor of pharmacology at Western Reserve University School of Medicine.

A very small amount of curare relaxes muscles. In such major operations as removal of the gallbladder, cancer of the bowel and stomach ulcers, relaxation of muscles is important. This can be done by putting the patient into a deep state of unconsciousness, but it requires the use of large amounts of anesthetics such as ether.

The element of danger in using large amounts of anesthetic might be avoided if curare could be used with the anesthetic. Curare is a poison, however. Dr. Chase's studies are aimed at finding the exactly safe dose of this poison, or safe and effective chemical substitutes for it.

Victims of spastic paralysis, possibly of infantile paralysis, and of some mental diseases may also be helped if his studies are successful. Curare has been used in all these conditions. In mental disease, it is used to reduce the violent muscular contractions which sometimes result in broken bones when shock treatment is given.

Science News Letter, October 5, 1946

ORNITHOLOGY

Tropical Cormorants Really Neck in Courtship

➤ NECKING, in a quite literal sense, plays a prominent part in the courtship of a pair of flightless tropical cormorants at the National Zoological Park in Washington, D. C. The birds actually wrap their necks around each other.

Assistant Head Keeper Malcolm Davis has been doing a little winchelling on the romantic antics of the pair. It usually starts while the female is taking a nap. The male comes up, starts stamping around her, at the same time uttering the typical, harsh, croaking call of the species. That usually suffices to wake her up.

The birds then go swimming on the pond in their enclosure. They spin round and round in a small circle, facing each other. If there is a stick floating nearby, one of them will pick it up and hold it in its beak, keeping right on spinning. And they keep right on squawking.

Then the necking begins: "Gradually the birds come closer and closer together," Mr. Davis reports, "and finally they entwine their necks. During this stage, which may last for a couple of revolutions of the spinning performance, their cries become milder. The pair sometimes circle about in the pond for as much as two minutes, then part, swimming separately for a short while, only to join again with louder and apparently more excited cries."

Then they do it all over again. And all the time, says Mr. Davis, their breasts are throbbing rapidly.

All of which may look very funny to a bystander, but the birds take it seriously. And if they weren't so much engrossed with each other, they might have opinions of their own about the hand-holding couples who are watching them over the low fence. You can't tell what looks quaint to a cormorant.

Science News Letter, October 5, 1946

ORDNANCE

Navy Improves Weapons Until Time of New Ones

➤ PLUTONIUM-LOADED super-long-range rockets, radio-guided to targets picked out by their television eyes, are something for the more or less far future. Until these terrific weapons come, however, the Navy is devoting some attention to the improvement of more familiar tools of war.

Here are a few, as listed in *Army Ordinance* (Sept.-Oct.):

A new .70-caliber machine gun, to replace the present .50-caliber weapon, which was the terror of enemy aircraft during the recent war. Its bullets will be nearly three-quarters of an inch in diameter, instead of the present gun's half-inch. Fire will be radar-controlled.

An automatic three-inch anti-aircraft cannon, twin-mounted like the present 40-millimeter Bofors, but throwing proximity-fused shells of nearly double its caliber and five or six times the weight of the Bofors projectiles.

An automatic five-inch rocket launcher able to get off its whizzing missiles at the rate of 40 a minute.

Completely automatic ammunition-handling and loading machinery for the triple eight-inch guns of heavy cruiser turrets, that will make possible a rate of fire several times greater than that of the present mechanisms, which are partly manually operated.

Science News Letter, October 5, 1946



RADIO

Radio Facsimile Weather Service Inaugurated

➤ COMPLETE weather maps and diagrams transmitted by radio facsimile will link forecast centers in this country with overseas weather stations to provide literal, accurate pictures of flying conditions.

The first postwar radio facsimile weather service began Sept. 1 between Hickam Field, Oahu, Hawaii, and Fairfield-Suisun, California. Operated by the Army Air Transport Command's Air Weather Service, the transmissions are sent over the two-way circuit four times daily and include prognostic weather maps covering the air route from the Hawaiian Islands to the Pacific Coast, special weather charts and diagrammatic weather analyses.

Radio facsimile was developed during the war, and the electronic weather transmitting equipment will be maintained by the Army Signal Corps.

The four periods of weather transmission over the new link between Hawaii and California are 5-6:30 a. m., 11 a. m. to 12:30 p. m., 5-6:30 p. m. and 11 p. m. to 3 a. m., PST.

Science News Letter, October 5, 1946

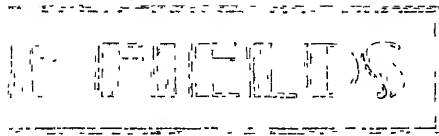
CHEMISTRY

Too Much Manganese Gives Disease to Apples

➤ MANGANESE, the steelmaker's friend, can be the apple-grower's enemy if too much of it is available in the soil where apple trees grow. An excess of manganese in acid orchard soil was found responsible for a disease that produces dead areas on the inner bark of apple trees, in researches conducted at the University of West Virginia by Anthony Berg and Genevieve Clulo.

Known technically as internal bark necrosis, this plant disease has hitherto been supposed to be due to lack of boron in the soil. However, young apple trees grown in soil known to be free of that element did not sicken, while others grown in soil to which manganese, or a mixture of manganese and iron, had been added, developed unquestionable necrosis symptoms.

Science News Letter, October 5, 1946



CHEMISTRY

NMRI-201, NMRI-448 Join Raid on Insects

➤ TWO EFFECTIVE new insect repellents have been developed at the Naval Medical Research Institute at Bethesda, Md., it is announced by Lt. L. A. Jachowski and Lt. Comdr. M. Pijoan in *Science* (Sept. 20). They have been designated NMRI-201 and NMRI-448, respectively. Of the two, NMRI-448 seems preferable, primarily because it does not irritate the skin, as NMRI-201 does in some cases.

Both repellents have the considerable advantage of retaining their efficacy when applied to sweaty skins. They were designed primarily for use against mosquitoes, but have been found effective against chiggers, black flies, sand flies, and bedbugs as well. One application will make these pests stay outside of biting range from three to twelve hours.

Science News Letter, October 5, 1946

RADAR

Light-Weight Radar To Make Flying Safer

➤ LIGHT-WEIGHT search radar, revealed by the Army Air Materiel Command, brings commercial and private planes one step nearer to the practical use of this war-developed safe-flying device. Only 125 pounds in weight, it can be used in any craft large enough to carry five passengers.

The Army will know the new development as the "APS-10." It is only a little heavier and slightly more complex than a home radio, Army officials state. Since it is operated by only five controls, it represents a great improvement over the 500-pound, 34-control radar employed by the Army during the war.

The new radar, designed to remove the hazard of flying in darkness or fog, with its cathode tube, 360-degree microwave scan, and reflections from objects in proportion to their position and degree of reflectivity, gives accurate fluorescent pictures of cities, rivers and terrain.

By flipping a switch, the scope can be made to trace any one of five ranges.

The large-scale details of the four-mile setting are best suited for close traffic flying, while the 90-mile range is most useful for cross-country navigation. The other ranges are intermediate.

The APS-10 is the first of a series of projected light-weight, easy-to-operate and maintain search radars. It was developed in conjunction with the government's Radiation Laboratory in Massachusetts, and with radar manufacturers. Future plans call for a 75-pound unit, which will provide even greater range at still lower cost.

Science News Letter, October 5, 1946

AERODYNAMICS

Cloud Detector Makes Night Flying Safer

➤ ANOTHER device to make night flying safer is now revealed. It is the cloud detector, an instrument for pilots to detect invisible dangerous clouds ahead by use of the cloud's radiation of infra-red or heat rays.

These are the same invisible light rays that soldiers in the Pacific employed in their snooper scopes to detect night-prowling Japs. However, unlike the snooper scope, the cloud detector is a receiving instrument only. It receives and measures the heat emissions of the cloud given off from it in the form of infra-red waves.

Scientists of the Langley Memorial Aeronautical Laboratory, Langley Field, Va., have developed and tested an experimental model of the cloud detector, the National Advisory Committee for Aeronautics states in a report. The instrument is far from perfection as yet, but in a number of night flights it has conclusively demonstrated that it can detect the presence of clouds not visible to the unaided eye.

Clouds of moderate thickness are almost perfect emitters of infra-red radiations, the NACA scientists state. Water vapor and carbon dioxide are the only constituents of the clear atmosphere that are important in modifying the exchange of radiation. The new instrument provides a practical means for determining the exchange of radiation between the receiver of the cloud detector and a cloud as modified by the intervening atmosphere. The determination takes into account the effect of the carbon dioxide and water-vapor content of the air.

Science News Letter, October 5, 1946

DENTISTRY

Southern Men Have Fewer Dental Defects

➤ HOW GOOD your teeth are depends more on where you live than how big your bank account is, a study of teeth of men enlisting in the Navy at the beginning of the war shows. The study was made by Comdr. C. A. Schlack and Lieut. J. E. Birren, of the Naval Medical Research Institute.

Men from the South had fewest dental defects, whereas men from New England and New York, Pennsylvania and New Jersey had the most. The latter regions had next to the highest per capita income and a much larger ratio of dentists to the population than the South.

"The average man," the Naval scientists report in the journal, *Science*, (Sept. 20), needed more dental attention when he entered the service than he had had up to that time. The mean number of cavities was about 10 per person and of fillings five per person.

Science News Letter, October 5, 1946

NUTRITION

Discovery of Three New Vitamins Aids Nutrition

➤ THREE NEW vitamins mark scientific progress toward better-nourished men, women and children during the past year, Dr. Charles Glen King, scientific director of the Nutrition Foundation, Inc., states in his annual report.

The three vitamins are folic acid; the anti-stiffness factor, and a still unnamed B vitamin. Folic acid is also a B vitamin. Its role in warding off anemias, intestinal diseases and impairment of the normal function of the bone marrow have been reported by a number of investigators during the year.

The anti-stiffness factor and the unnamed B vitamin are known so far only for their effects in chickens and guinea pigs. But folic acid, not so long ago, was considered "only something that a bug needs," Dr. King points out.

Guinea pigs without the anti-stiffness factor in their food get an abnormal calcification of bones and flesh which makes them stiff.

Chicks need the unnamed B vitamin to grow, but humans may also need it for prevention of some forms of anemia. It is believed closely associated with folic acid in liver.

Science News Letter, October 5, 1946

GENERAL SCIENCE

Shortage of Scientists

Our reliance on such marvels of science as radar and the atomic bomb gives false security since there are few to carry on scientific work of the future.

By MARGARET E. PATTERSON

➤ IF YOU were asked to name the most serious shortage now facing us, would your answer be:

Nylons, sugar, steaks, shirts, meat, rubber?

These are not the right answers. A much more serious shortage menaces us today and threatens our future:

A shortage of scientists.

The annoying scarcity of nylon hose and thick steaks may temporarily blind you to the seriousness of a deficit of those individuals who should now be building in your post-war world.

To some the shortage of scientists may seem only a far-away threat to that promised existence of time-saving, labor-saving gadgetry, but it has been a matter of serious anxiety for six years to those who anticipated the circumstances in which we now find ourselves.

As early as 1940 scientific manpower training was cut in some fields and this curtailment has continued in ever increasing proportions. The deficit that has resulted is sweeping and costly. No recovery measures are yet established.

Every neighborhood has had its own cases of boys drafted or patriotically enlisting in the armed forces when their greatest usefulness to our country should be the training of those talents that are our country's rarest resource.

England and Russia learned their lesson in World War I. They zealously withheld those boys with ability in science from armed service in World War II. This uninterrupted training has given those countries a backlog of trained scientists untouched by war's ravages.

Our reliance on such marvels of World War II science as radar, proximity fuses, penicillin, DDT and the atomic bomb is a false security. Such applications of science can only be made for winning wars and securing peace by men and women who have mastered the intricacies of modern science. Once devised, these devices can be duplicated.

The atomic bomb was developed in five years, but this speed in an emer-

gency was only possible because the men who developed it had each had years of training in basic sciences.

While we have the atomic bomb, England and Russia have their stockpile of trained young scientists. Which spells security?

Science Talent Search

Just how seriously we have undercut our own security can be illustrated with carefully kept statistics on a small group of young scientists, all under 23 years of age. They are the winners in the annual Science Talent Search for the Westinghouse Science Scholarships, sponsored by Science Clubs of America, administered by Science Service.

For five years, 40 boys and girls have been chosen annually as winners from public, private and parochial schools. About 16,000 high school seniors enter this competition every year, only to be pared down by their own inability or lassitude to approximately 3500. These

survivors are further reduced to 300 by a super-stiff science aptitude examination, consideration of high school scholastic record, personal recommendations and a 1000 word essay on "My Scientific Project."

From the 300, judges choose 40 winners who spend five days together in Washington at the Science Talent Institute learning first hand about the future of science from some of the world's foremost scientists. Some of the great research men and women of our time are expected to come from these winners of the annual Science Talent Search.

How did the 200 in the winner group fare in the war years?

There are 54 women in this highly selected research-talented group; they were untouched by the draft, of course. They have all had uninterrupted college careers.

There are 146 men and all are draft-eligible—or will be soon. Of these, 73 have been or are now in the armed services. This is a staggering percentage when one considers that 52 of the 146 are still under draft age.

Armed Service Programs

The high cost of war to our training of scientists is only slightly lessened by the fact that 30 of the 73 have been allowed to continue college work in armed service programs. Of these, 13 have won degrees and commissions, and another seven will finish their degrees and receive commissions soon.

Even those who have been fortunate enough to earn degrees during their tour of duty have often been forced to take them in fields which are not their major interests. They will have to begin their training again when they become civilians if they are to carry out the designs for their chosen professions.

This is a sad story in the light of what these young men should have been doing during the past years. But like thousands of other potential scientists, they met the situation with good grace and in many instances are grateful for experience in working with other men, travel, and the opening of new vistas of science which they might not otherwise have known.

Robert Mark of Trenton, N. J., has his degree from Massachusetts Institute of Technology in aeronautical engineering. As an ensign he has been



CHEMIST — Better way to make synthetic rubber is Ph.D. problem of Wolf Karo, refugee winner, now at Cornell University.

commissioned to specialize on guided missiles, pilotless aircraft and the operation of radio and radar guided missiles. But he still hopes to be a mathematician as he planned when he started at MIT as a civilian.

While still in high school Robert Hall of Green Bay, Wis., was a member of the Society for American Archaeology and had gained some reputation for his published studies on the restoration of Indian pottery found in his state. He went directly into the radio technician training in the Navy and has had to discontinue his archaeological studies and writing on the Iroquois Indians until he can enter college.

Murray Gerstenhaber of New York City wants to be a mathematician. Before being drafted, he spent two years at Yale, where he received the Thatcher Award for "highest proficiency in basic physical sciences." Now a Pfc. in the occupation forces, he is assigned to the science department of American University in Berlin as an administrative non-com. In the evenings he attends the Mathematics Institute of the University of Berlin, where he studies algebraic functions in a seminar with the professor and four instructors.

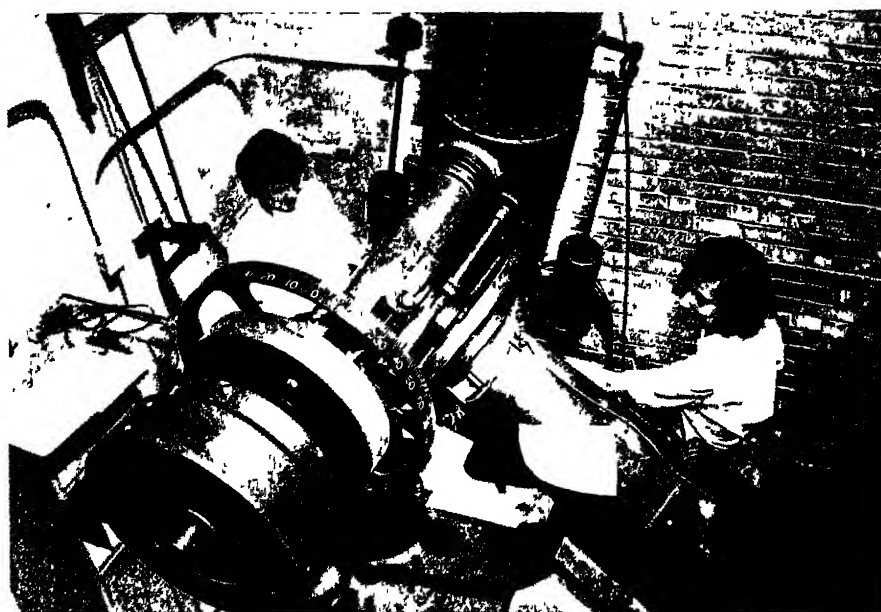
Before he went into the Army three years ago, Barton Brown of Sea Cliff, N. Y., was a student of chemistry at MIT. He has now returned to college to study electronics in which he became interested from his war service.

Some Continue College

Only 28 men chosen as winners in the first three Science Talent Searches have been free to continue their college careers uninterrupted by the armed services. They have chosen the following professions: physics (8), medicine (6), chemistry (4), chemical engineering (3), mathematics, anthropology, biochemistry and electrical engineering.

Among them are 10 with undergraduate degrees, two with masters' degrees and two already at work on their Ph.Ds. Four are well started in medical school. Three of the 28 are Phi Beta Kappas and one has been elected to Sigma Xi.

Paul Craneheld of Columbus, Wis., has completed his first year of medical school at the University of Wisconsin and plans to specialize in physiology. He was a student assistant in chemistry and physics during his undergraduate days there and taught younger STS winners. He turned his assistantship over to Elizabeth Lean of Shorewood, Wis., another



STAR-GAZERS—Color of stars is studied by Constance Sawyer of Smith and Anne Hagopian of Radcliffe at Harvard's Oak Ridge Station.

winner, when he entered medical school.

The top boy winner in the first Science Talent Search is Paul Teschan of Shorewood, Wis., who has finished his second year at the medical school of the University of Minnesota. A member of Phi Beta Kappa, he finds time for a regular job of lecturing to nurses. He plans to be a physician but will make teaching, and clinical and medical research his specialty.

Murray Rosenblatt of New York City will enter Cornell in the fall on the Erastus Brooks Fellowship to begin his graduate work in mathematics and mathematical physics after graduating Phi Beta Kappa from College of the City of New York. He has spent a summer at the Bureau of the Census in examining the results of the Agricultural Census of 1945 in an attempt to eliminate bias.

Others in College

At the University of Michigan, Irving Rozian of Hazel Park, Mich., is working for degrees in both chemical and electrical engineering. He held a student assistantship during the war in secret electronic research and has done drafting and drawing for a commercial firm and illustrated books.

During his high school days Edward Kosower, top boy winner of 1945, had a chemical business with Andrew Streitwieser, another STS winner in Brooklyn, N. Y. Now Edward is a student at MIT,

where he had often sold his war-short chemicals. He continues to publish the results of his research in chemical journals and in the Tech Engineering News. Because of his proficiency he has been allowed to skip certain courses in organic chemistry.

Clifford Swartz of Niagara Falls, N. Y., had two degrees from the University of Rochester at the age of 21 and had been elected to Sigma Xi and Phi Beta Kappa. He is now at work on his Ph.D. thesis in nuclear physics there and has been serving as a graduate assistant to Dr. Lee DuBridge, who will now assume the presidency of California Institute of Technology.

The 54 women who have been named as winners in the Science Talent Search present an encouraging picture as their education has been uninterrupted by war service.

by
W. H. GEORGE

THE SCIENTIST IN ACTION

A SCIENTIFIC STUDY OF HIS METHODS

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Do You Know?

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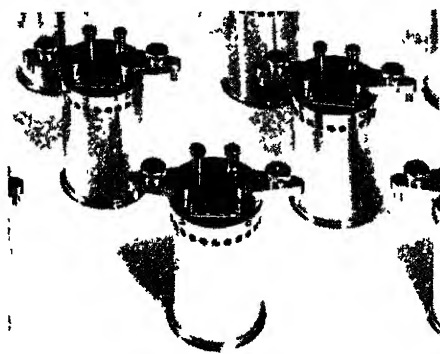
In every second the *sun* loses in the form of energy 4,000,000 tons of its substance.

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The use of *casein* as an adhesive dates back to the eleventh century when glue was made out of curds and slaked lime.

Nicotine has been a valuable tool in the hands of neurophysiologists in mapping out fibers of the involuntary nervous system.

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Though some are still too young to have chosen their fields, the winners of the first three years are following these professions: chemist (11), physician (5), biochemist (4), mathematician (3), astronomer (3), zoologist (2), chemical engineer, psychologist, biologist, physicist and anthropologist.

Nine already have undergraduate degrees, one a master's and will start this fall on her Ph.D. and three are well started in medical school. Six of them are Phi Beta Kappa and one has been elected to Sigma Xi.

Having finished two degrees at Ohio State University, Mrs. Gloria Lauer Grace will enter Columbia University this fall on a fellowship to work on her Ph.D. in psychology. A member of Phi Beta Kappa and Mortar Board, she was teaching assistant and psychomatrixian at Ohio State during the past year. She was married this spring to a returned veteran who will also study at Columbia. Mrs. Grace was the top girl winner in 1943.

Her undergraduate work at the Uni-

NUTRITION

C-Rations Make Exit

➤ NO MORE C-rations!

This pet hate of combat GI's is on the way out. Its place will be taken by a new battle-front food assortment to be known as E-rations.

Superficially, E-ration resembles C-ration. It is made up of six cans, containing rations for one man for one day. But there have been some changes made. Three outstanding ones are:

Canned baked bread—real white bread—instead of those (deleted by censor) biscuits.

Larger variety of meats.

Addition of a can of fruit.

A 30-day test of the new ration on troops of the Third Battalion, 38th Infantry has been conducted at Camp Carson, Colo. Representatives of the Quartermaster Corps and the Army Surgeon General's Office are coming to the conclusion that it is the most satisfactory individual combat diet yet developed.

There aren't as many calories in the new E-ration as in the old C-ration, but this is offset by the fact that soldiers used to throw away items from the C-ration that they didn't like. So the net result is likely to be more food actually eaten out of the smaller package. The

versity of Illinois finished, Elizabeth Foster of Oak Park, Ill., is now at MIT, where she is a research assistant and studying for her second degree in biochemistry. At Illinois, where she was elected to Sigma Xi, she made a study of fibrous proteins with the electron microscope. Last summer she studied cellular physiology at the Marine Biological Laboratory at Woods Hole, Mass.

After five years the Science Talent Search has become a fixture and tradition in the high schools of the country. Thousands of boys and girls now are at work on their entries in the Sixth Science Talent Search hoping to bring honor to their schools again or for the first time. They hope, too, that they will be among the 40 trip winners to Washington and recipients of Westinghouse Science Scholarships.

But even those who do not place as one of the 40 trip winners may be among the 260 honorable mentions named and assisted by recommendations to enter the colleges, universities and technical schools of their own choice.

Science News Letter, October 5, 1946

new ration, incidentally, weighs just one-half ounce under four and one-half pounds.

Officers in charge of the test are not yet satisfied with the canned white bread, and have directed that research continue for bread that will meet specifications.

Science News Letter, October 5, 1946

YOUR HAIR AND ITS CARE

By Oscar L. Levin, M.D.
and Howard T. Behrman, M.D.

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Announcement to Teachers

"After reading Science News Letter thoroughly, I feel still more certain than before that your publication is the *only practical means* for a high school boy to keep up with the sciences." DONALD ROSS, Student at Cranbrook School, Bloomfield Hills, Michigan.

"You have a splendid publication and I wish that it could be in *every* library and in *every* reading room" P. B. HILL, 106 East Goodwin St., Victoria, Texas.

"Science News Letter is discussed very thoroughly in our classrooms. We are happy to be able to get such information. Each student looks forward to Friday classes which are devoted to Science News Letter. We are thankful to get up to date developments in the various fields of science." M. C. SMITH, Oxford, Florida.

"This is to let you know that I have been receiving the Science News Letter and it has proven to be a *helpful source* for information in the guiding of my students into the proper channels for current news on scientific problems." GEO. B. HOLLINSWORTH, 508 S. Randall St., East Point, Georgia.

"Science News Letter came to my husband, Dr. W. W. Hickman, in Assuit, Egypt (Assuit College) for many, many years. It was *avidly devoured* by many—not only American and Egyptian staff members but also by aspiring students" MRS. ALICE E. HICKMAN, 1125 East Detroit Avenue, Monmouth, Illinois.

"We have been reading Science News Letter for one year now, and we like it better than any other publication of this kind we have seen. The *whole family* enjoys the short easy-to-understand articles on science which affect the everyday lives of people." W. P. SELLERS, P. O. Box 216, Washington, Louisiana.

"The fact that I am unwilling to miss a single issue of Science News Letter should be adequate evidence of the esteem in which I hold it." JAMES T. LAING, Head, Dept of Sociology, Kent State University, Kent, Ohio.

"I think Science News Letter carries the best news I've seen—so does the C. P. Club," SISTER M. COLETTE, St. Benaventure High Schol, 1806 15th Street, Columbus, Nebraska.

"Very *instructive* magazine. I could not do without it in my teaching." MISS NORMA KOCH, R. R. #4, Box 476, Indianapolis, Indiana.

"I can truthfully say that Science News Letter and Chemistry are invaluable *aids* in my chemistry classes." MRS. MARY E. VOORHEES, Belt, Montana.

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Science News Letter, October 5, 1946

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Hybrid Corn

➤ DURING all the shouting and the tumult that accompanied and followed Henry Wallace's exit from public office, no one seems to have taken thought to mention what may in the end turn out to be the man's greatest contribution to the welfare of his country: the introduction into general cultivation of hybrid corn

Henry Wallace did not originate hybrid corn. First work in corn hybridization was done shortly after the turn of the century by two men, Dr. George H. Shull and the late Dr. E. M. East. Other geneticists followed up their work and made further advances. Scientists knew about this, but farmers didn't. And they kept on planting the old varieties of mixed and haphazard ancestry.

Ten or a dozen years before he became Secretary of Agriculture, Henry Wallace, then still editor of the farm weekly his grandfather had founded, started a campaign to get farmers to plant hybrid corn. Since hybrid seed has to be produced by a special technique not at the command of every farmer, he also founded a company to produce and sell it, which is still in business.

It was difficult at first to persuade hard-headed farmers to buy the necessarily expensive hybrid seedcorn, when they could raise their own open-pollinated seed. But figures on comparative yields per acre are a language every farmer can understand. Once a start was made, cultivation of hybrid corn spread very rapidly, until now practically all of the corn raised for meat or money in this country is of hybrid strains.

When he started his campaign, Henry Wallace ventured the estimate that grow-

ing hybrid corn would give the farmer a ten per cent better yield per acre than the old varieties. He proved to be much too conservative. The average per-acre increase has been nearer twenty per cent.

Hybrid corn's advantages are twofold. First, because pollination is strictly controlled, it is possible to breed into a new strain any desired set of hereditary qualities, such as high protein content, drought resistance, etc. Second, the plants have what is known as hybrid vigor. Hybrids generally, whether plant or animal, tend to be bigger, stronger and more robust than either of their parents—consider, for example, the mule. This combination of predictable genetic behavior and individual lustiness is what has made hybrid corn a winner.

Science News Letter, October 5, 1946

GENERAL SCIENCE

Army Trains Four Groups Of German Shepherds

➤ DOGS ARE more important in the future plans of the Army than horses, with sledge dogs serving in the North and German shepherds scheduled to be trained as infantry scouts. The Army is still raising horses, but as a service to breeders instead of for military use.

Although 20,000 dogs of five different breeds were used by the Army in World War II, most of these have been discharged, and the new "dog's life Army" will start out with only four platoons of 27 dogs each. These are stationed at Camp Campbell, Ky., Fort Bragg, N. C., Fort Lewis, Wash., and Fort Riley, Kans.

Experience during the war showed that German shepherds were superior for infantry scouting to Belgian sheep dogs, Doberman pinschers, farm-type collies and schnauzers, so the Army will use only the German shepherds. The Army rated them tops in intelligence, durability and size for combat duty.

The Quartermaster Corps plans to acquire 30 of the dogs each year as replacements. Only German shepherds between one and two-and-a-half years old are eligible.

The dog's instructors will receive an eight-week training course at the Ale-shire Quartermaster Depot, Front Royal, Va., and these men will be in charge of training both the dogs and handlers assigned to platoons with dogs.

Science News Letter, October 5, 1946

Books of the Week

AIRCRAFT CARBURETION—Robert Thorner—*Wiley*, 393 p., illus., diagrs and charts \$3.50. This book deals with the fundamental principles of carburetors and related equipment in aircraft. It is designed for aircraft mechanics, pilots and flight engineers, development engineers and designers, field service engineers for airplane engines, as well as for use by students taking a course in aircraft engines.

THE AMAZING ELECTRON—James Shannon—*Bruce Pub.*, 248 p., illus., diagrs and charts, \$4.00. In a carefully planned explanation the author shows the nature of the electron, its mass, its charge, its relation to the whole atom and its role in the make-up of the atom.

AMINO ACID ANALYSIS OF PROTEINS—Roy W. Miner, Ed.—*New York Academy of Sciences*, 183 p., tables, \$2.25. Vol. XLVII, Art. 2.

THE CAR OWNER'S HANDBOOK—Paul Green and Ralph Ritchie—*Duell, Sloan and Pearce*, 192 p., illus. and diagrs., \$2.50. In an easy and practical way this introduces car owners and drivers to the make-up and function of the automobile. The ways and means of keeping a car running and in good condition are described in the clearest manner.

DEVELOPMENTAL ANATOMY. A Textbook and Laboratory Manual of Embryology, 5th Ed.—Leslie B. Arey—*Saunders*, 616 p., illus., \$7.00. A review of the world literature in embryology since 1940, and particularly as it affects human development.

FAMILIAR TREES—William A. Merrill—*published by the author*, 174 p., illus., \$3.00. This book was written especially for persons living in the United States east of the Rockies. The language is fairly simple and the treatment introductory.

FUNDAMENTALS OF CHEMISTRY, 6th Ed.—L. Jean Bogert—*Saunders*, 571 p., illus and diagrs., \$3.00. A textbook of the theory and applications of chemistry for the Senior high school level with accompanying LABORATORY MANUAL OF CHEMISTRY, 5th Ed., 196 p., \$1.00, and SUGGESTIONS FOR COURSES IN GENERAL CHEMISTRY, a teacher's guide.

GLASS HOUSE OF PREJUDICE—Dorothy Baruch—*Morrow*, 205 p., \$2.50. This book describes the results and causes of prejudice toward minority groups in the United States. It explains with clarity and force the effects of prejudice both on the people toward whom it is felt and on the people who feel it.

GROWING UP SAFELY—Frances Mayfarth, ed.—*Assoc. for Childhood Education*, 28 p., illus., paper, 50 cents. This bulletin has been prepared for the teachers in the elementary school in the hope that they will find it helpful in their work with parents and in their planning for the best development of the children they teach.

MATHEMATICAL METHODS OF STATISTICS—Harold Cramer—*Princeton University Press*, 575 p., \$6.00. The author has joined classical calculus and mathematical theory in a masterly exposition of the mathematical methods of modern statistics.

PEOPLE IN QUANDARIES. The Semantics of Personal Adjustment—Wendell Johnson—*Harper*, 532 p., \$3.75. This book deals with the problems that plague all of us day in and day out as we try to get along with ourselves and with each other. They are the basic problems of our homes and communities, our schools and industries, our nation and our world.

PLANT MAGIC—James P. Haworth—*Binfords & Mort*, 148 p., illus., \$3.00. A book that tells the fascinating story of how nature creates new plant species and of man's progress in learning and applying her secrets.

PRINCE GODFREY. The Knight of the Star of the Navvity—Halina Gorska—*Roy Pubs.*, 207 p., illus., \$3.00. Within this book are twelve wondrous tales concerning Prince Godfrey. It tells the adventures of one brave knight who was like Galahad in his purity and kindness.

UNUSUAL WORDS: And How They Came About—Edwin Radford—*Philosophical Library*, 318 p., \$3.75. A collection in a single volume of the principal proverbial "tags," phrases and words, together with their origins and derivations.

USING OUR WORLD—Powers, Neuner, Bruner and Bradley—*Ginn*, 665 p., illus., and

diagrs., \$2.16. This textbook, developed from the three books in the "Adventuring in Science" series, makes the study of general science a delightful adventure for ninth-year pupils.

UTILIZATION OF SEAWEEDES FROM THE SOUTH ATLANTIC AND GULF COASTS FOR AGAR AND ITS DECOMPOSITION BY BACTERIA—*Duke Univ. Press*, 80 p., illus., tables, charts, paper, \$2.00. Duke Univ. Marine Station Bulletin No. 3.

THE YALE COLLECTIONS—Wilmarth S. Lewis—*Yale Univ. Press*, 54 p., illus., \$2.00. This is a short survey of the collections of books and manuscripts, objects of art, natural history and anthropology, which have come to Yale during the past two and a half centuries.

Science News Letter, October 5, 1946

RADAR

Radar Information Projected on Screen

➤ RADAR information can be projected on a screen, and made visible to a large group of people by German-developed equipment. With a new dark-trace cathode ray tube, the image can be retained indefinitely for study, or can be completely erased.

Science News Letter, October 5, 1946

THE ENCYCLOPEDIA OF PSYCHOLOGY

PHILIP LAWRENCE HARRIMAN, *Editor*

THIS monumental work is one of the most important reference books in psychology to appear in many decades. Definitive articles written by renowned authorities deal with all the major topics in modern American psychology.

This volume has been planned to accomplish three major purposes. *First*, it is designed to meet the requirements of the serious investigator who wishes to acquaint himself with various topics in modern psychology which lie outside his field of special interest and competence.

Secondly, it furnishes a useful book in which the student can browse with pleasure and benefit. *Thirdly*, it is intended to emphasize some of the trends in contemporary psychology which seem to have supplanted much of the traditional material.

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Science News Letter, October 5, 1946

⚙️ **WIND-DRIVEN** electric generators, to charge farm storage batteries, are designed to operate in the varying winds. Two generators on a single shaft are separated by a clutch. The first operates at full load under light wind. Stronger wind causes the clutch to engage the other, thus putting more load on the windmill and holding down its speed.

Science News Letter, October 5, 1946

⚙️ **CU' TING** attachment for garden hose is a thin, reinforced hardened steel blade with a sharp cutting edge that fits over the ordinary hoe blade. It has side flanges to hold it in place, and stops or seats for taking up the thrust of the blade against the plate when in use.

Science News Letter, October 5, 1946

⚙️ **HEDGE TRIMMER** has two metal disks pivoted together at their centers, each of which has arched cutting teeth at their outer edges. The teeth on each are arched in opposite directions, and cut like hooked clippers when the extended handles are pressed together.

Science News Letter, October 5, 1946



⚙️ **HEEL-STRAP OVERSHOES**, shown in the picture, have non-skid soles made of neoprene, a synthetic rubber that resists wear, abrasion and injury from street oils. They can be cleaned with soap and water, or with ordinary cleaning fluid, so that they will not soil articles in a handbag.

Science News Letter, October 5, 1946

⚙️ **SCAFFOLD**, particularly suited for inside work, is made of a plank and two special ladders. The ladders, like those in ordinary step-ladders, have bars across the rear and just above each step. These, with the steps, grasp the plank firmly when the ladders are leaned inward.

Science News Letter, October 5, 1946

⚙️ **BABY** comfort crib has a special mattress supported over a horizontally rotating electric fan which forces air through it for cooling by means of tubular channels. By a special heating arrangement warmed instead of cooled air can be delivered.

Science News Letter, October 5, 1946

⚙️ **DEWPOINT** recorder determines automatically and continuously the amount of moisture in a gas, and might be used in refrigerators. It is an electronic combination of heater, refrigerator, mirror and gas chamber. Gas under test is fed over a stainless steel mirror, forming dew on it when properly heated or cooled.

Science News Letter, October 5, 1946

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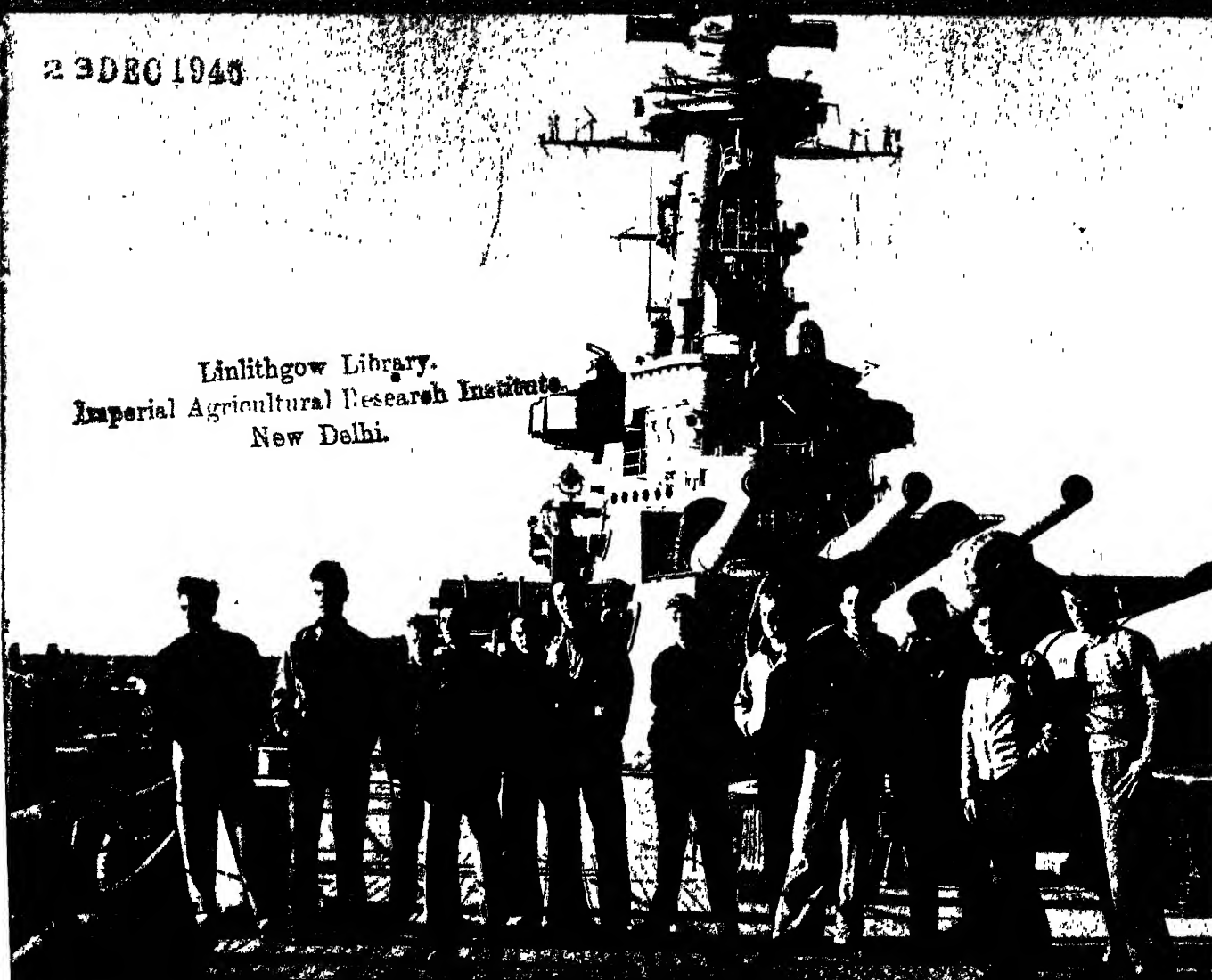
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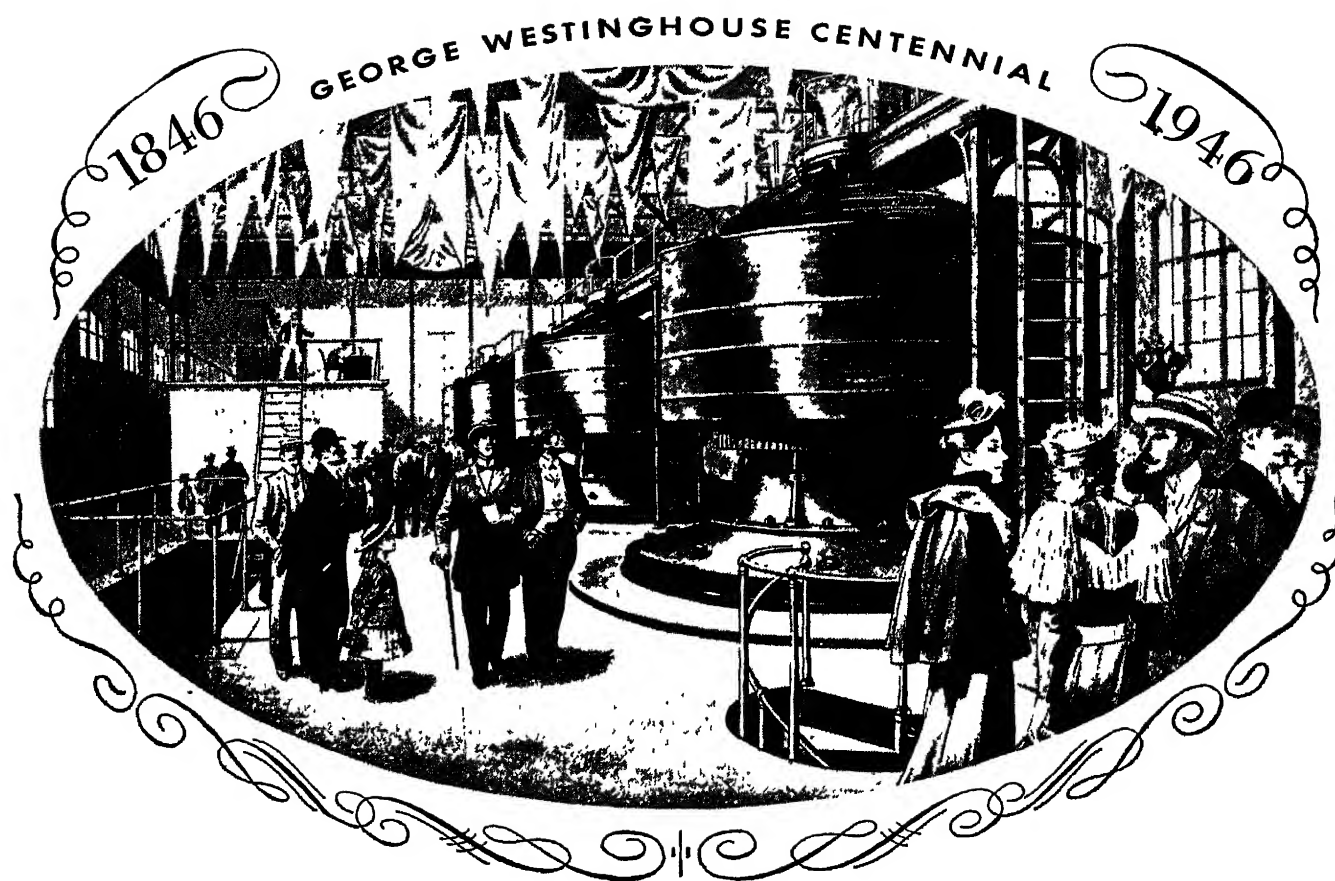
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A SCIENCE SERVICE PUBLICATION



Harnessing the Power of Niagara

For thousands of years, water had roared over Niagara Falls at the rate of about 200,000 cubic feet per second—representing enough power to supply the annual requirements of 24,000,000 average homes. This enormous power continued to go to waste until...

In the late 1880's, a group of world-famous engineers began to study the problem of harnessing the vast power of Niagara Falls.

A bitter controversy raged for years as to whether *alternating* or *direct* current should be used. George Westinghouse, the world's greatest authority on alternating current, vigorously supported the *a-c* system.

Then, at the Chicago World's Fair in 1893, Westinghouse demonstrated the unqualified supremacy of the *poly-*

phase system for the generation and transmission of alternating current electricity.

In October of that year George Westinghouse won his famous "battle of the currents"—and received the contract for three 5,000-horsepower polyphase generators to be installed at Niagara Falls.

These world's largest a-c generators had to be engineered from the ground up. But within two years, the three mammoth units were placed in operation. And a year later electric power was supplying the needs of Buffalo, N.Y.... 20 miles away!

It was a major victory for mankind as well as for George Westinghouse—for it set the pace for power development all over the world.



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TODAY—The Westinghouse Electric Corporation supplies much of the world's needs for the generation, transmission and utilization of electric power. For instance, throughout the world there are Westinghouse water-wheel generators with a total capacity of more than 12,000,000 kva. In addition, steam and engine-driven generators, with a combined capacity of *many more million kva*, proudly bear the Westinghouse name plate.

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ASTRONOMY

Heavenly Fireworks Flash

Century's most brilliant meteor shower was seen by many observers on Oct. 9. Some counted as many as 100 falling stars a minute.

➤ THE GREATEST and most brilliant meteor shower of the century occurred on Oct. 9, probably excelling even the 1933 shower caused by the same Giacobini-Zinner comet.

Reports to Science Service from far-flung points indicate some meteors so bright that they outshone Sirius, the most brilliant star in the heavens. Some would have cast shadows had there been no moon, concludes Prof. C. C. Wylie of the University of Iowa.

Astronomers in parts of the east had to take to airplanes in order to get above obscuring clouds. Observers on the Pacific Coast reported a spectacular display, undimmed by moonlight interference in its early stages. Army weathermen report the display was seen in Germany.

A hundred meteors a minute flashed across the sky for stargazers at Berkeley, Calif., reports Dr. Leland E. Cunningham of the University of California's Student's Observatory. From Norman, Okla., Dr. Balfour S. Whitney of the University of Oklahoma states that one observer counted 2,850 "falling stars" during one hour. At Madison, Wis., several observers reporting to Dr. C. M. Huffer of Washburn Observatory counted 1,500 in an hour. Two or three meteors a second flew over observers in Eugene, Ore., Prof. J. H. Pruett of the University of Oregon states.

Within an hour and a quarter 3,003 "shooting stars" had been counted by Walter S. Houston of Cincinnati, Ohio, member of the American Meteor Society. At the height of the shower he counted 510 meteors within five minutes.

During one five-minute period, 23 meteors shone through cirrus clouds at Lawrence, Kans., to be seen by Prof. N. W. Storer of the University of Kansas. Breaks in the clouds permitted observers within five minutes to count 117 meteors, most of them as bright as the brightest stars visible. Within five minutes Dr. Ralph B. Baldwin of Grand Rapids, Mich., counted 57 meteors, although the sky there was only one-third clear.

High in a Coast Guard plane, Harvard astronomers during one minute counted through the clouds 23 meteors,

including three brighter than Sirius.

Astronomers are particularly pleased with the fact that the shower came at the predicted hour, reaching its maximum around 9:40 EST. The height of the shower seems to have been shorter-lived than the display in 1933, when the earth earlier plowed through cosmic dust left by the faint comet.

At the time of the shower, the earth was within 135,000 miles of the path taken by the Giacobini-Zinner comet, as compared with 500,000 miles during the recent historic shower. The comet had sped by this heavenly intersection just eight days previously.

In one hour, more meteors were seen than in a normal lifetime.

By the time darkness had fallen over the Americas 13 years ago, the shower of "shooting stars" was barely detectable. Reports reaching Science Service through the Army Air Forces' Air Weather Service show that a meteor shower, though probably not as brilliant as the one here, was visible in Europe. In Zug Spitze, Germany, 105 meteors were seen during a ten-minute interval.

At Goose Bay, Newfoundland, 33 were counted during one ten-minute interval, and 11 at another. Observers in the tropics, however, were less fortunate. Only a few were seen during the evening by sky-searchers in British Guiana and Trinidad.

Clouds Block Shower

Although clouds cheated star lovers throughout a large part of the United States of a chance to see the display of "shooting stars," meteors flashing across the sky every minute or two were "seen" by means of radar.

Radio engineers at the Bureau of Standards' ionospheric station at Sterling, Va., used a war-time radar set to detect the passing of these bullets from space. The Army Signal Corps' laboratory at Belmar, N. J., recorded the "falling stars" by radar. Meteors streaking across the heavens were counted on the radarscope at Harvard's Oak Ridge station.

This is the first time a meteor shower has been observed by means of radar. Echoes from meteors 80 to 100 miles

above the earth, just like echoes from the moon, appear as "pips" on the scope screen.

During the height of the shower, meteors registered themselves on the radar screen every minute or two. It was not the meteor itself, but its tail of winged particles that registered on the scope. Twelve were "pipped" in an eight-minute period. And yet the radar beam, which was fixed instead of revolving, encompassed only about three percent of the sky, which will give some idea of the height of the storm.

Science News Letter, October 19, 1946

MEDICINE

Bacteriologist Receives Gorgas Medal for Service

➤ BRIGADIER GENERAL Raymond A. Kelser received the 1946 Gorgas Medal, sponsored by Wyeth Incorporated of Philadelphia, and awarded by the Association of Military Surgeons of the United States for outstanding work in preventive medicine for the armed forces. During World War II General Kelser served as director of the Veterinary Division of the Surgeon General's Office of the U. S. Army and did prominent work in eradicating rinderpest, a cattle disease, in the Philippine Islands, enabling the Filipinos to have their own domestic milk supply. General Kelser is now dean of the College of Veterinary Medicine and professor of bacteriology at the University of Pennsylvania.

Science News Letter, October 19, 1946



BACTERIOLOGIST — Brigadier General Raymond A. Kelser, recipient of the Gorgas Medal.

BIOCHEMISTRY

Enzymes Affect Cancer

► LOOK TO STUDY of enzymes for the solution of the mystery of cancer and possible chemical cure for it, Dr. Van R. Potter, associate professor of cancer research at the University of Wisconsin, told members of the American Chemical Society in Omaha.

Pepsin, a chemical in stomach juices which helps digest food, is an enzyme many laymen have heard about. There are many others in the body which scientists know and are studying. Prof. Potter explained the function of enzymes as follows: "Enzymes act somewhat like switchmen in a railroad yard or like valve-operators in a chemical factory, determining which way the materials of the body shall be used. In cancer cells, defective enzyme systems would act like saboteurs in a switchyard, sending trains off on the wrong track. These switchmen, which we call enzymes, no longer need to be thought of as vague influences. Thanks to the work of hundreds of chemists, we know that, like vitamins and hormones, enzymes are definite chemical compounds, except that their structures are even more complicated. Like other chemical compounds, enzymes can be subjected to quantitative chemical analysis, using the specialized methods of enzyme chemistry."

He traced the course of progress in the case of one particular class of enzymes, the energy-transformers, and showed how discoveries in the decade

between 1930 and 1940 led to a simple concept of how foodstuffs are oxidized in the body, and how the resultant energy is stored in chemical reservoirs instead of being converted wholly to heat.

Prof. Potter showed how he had used this work on normal tissues as a blueprint for the study of the enzymes of cancer tissue. It was found that certain enzymes which were abundant in some normal tissues like liver and kidney were scarce in tumor tissues, while other normal tissues such as lung, spleen and skin had even less than the tumors.

"What is needed," he said, "is a measuring stick to tell us how much of an enzyme a particular tissue needs. In other words, in order to know whether you have enough gasoline in your car, you need to know the distance between you and the next filling station."

In summarizing the facts accumulated thus far, Prof. Potter added: "This body of knowledge is a beachhead from which further attacks on other phases of cancer metabolism can and are being launched. For the fullest exploitation of this beachhead we need the help of the fundamental investigators who keep supplying us with new blueprints. I am confident that the mystery of cancer will ultimately be explained in terms of enzymes, and when that time comes, we can be more helpful about looking for methods of chemotherapy."

Science News Letter, October 19, 1946

the bland diet, the sick call rate dropped to 4%. There were no cases of nausea and vomiting and only 15% of the complaints were due to intestinal disturbance.

The egg and milk mixture sped Army wounded and post-operative patients in Europe back to duty in about one-third the average time.

The high protein content of the mixture, together with its high caloric value from the fat and carbohydrate it contains, and its lack of irritation to stomach and intestines constitute its advantages.

"Prolonged convalescence will be a rarity," Dr. Pollack predicted, when this war lesson is applied.

Science News Letter, October 19, 1946

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MEDICINE

Mixture Speeds Recovery

► YOU WILL spend a third less time recuperating from your next operation or serious illness if your doctor applies a feeding lesson learned in treating war wounded and starving victims of concentration camps.

A mixture of powdered egg and powdered milk, which tastes like egg nog or ice cream and can be poured down your throat if you are too sick to sip it from a spoon, is the food you will get, plus a little water.

Speed-ups in recovery achieved by this diet, called a "revolutionary innovation in the basic care of the sick," were reported by Dr. Herbert Pollack, of Mount Sinai Hospital, New York, at the meeting of the American Chemical Society.

As chief medical consultant for the Army in the European Theater, Dr. Pollack worked with concentration camp victims while the bullets were still whistling overhead.

Of 92,000 soldiers liberated from German prison camps and treated with this bland diet, only eight died, he reported, although 40% of them suffered from severe malnutrition and at least 80% were undernourished.

At Recovered Allied Military Prisoners camps, there was an average daily sick call rate of over 20% when the men were fed an ordinary Army ration. About four-fifths of the complaints were due to stomach and intestinal disturbances. One week after introduction of

ANTHROPOLOGY

Ancient Melbourne Man Gets Remodeled Skull

► FLORIDA'S ancient Melbourne man has a remodeled skull—and a new claim among the earliest inhabitants of this continent.

The remodeling was done by Dr. T. Dale Stewart, curator of physical anthropology of the Smithsonian Institution, after searching for and finding bone fragments, missing from the crushed human skull discovered about 20 years ago near Melbourne, Fla.

Most anthropologists identified the original round skull, crudely reconstructed, as that of a "recent" Florida Indian. Dr. Stewart tore the skull apart and refitted the pieces with the newly-found fragments into a long-headed skull, similar to the earliest human skeletal remains in this country.

Stone arrow heads, lying directly under the bones of a prehistoric mammoth at the original Melbourne excavation, strengthened the much debated theory that humans and mastodons lived in Florida at the same time—possibly 10,000 years ago, near the end of the last ice age.

Science News Letter, October 19, 1946

MEDICINE

Control Measures Halt Japanese "B" Encephalitis

► VACCINATION and mosquito control have virtually eliminated the danger of Japanese "B" type encephalitis to American service personnel in the Orient.

This is the statement of Harold F. Gray, University of California mosquito control expert, who has returned from a mission to Japan for the War Department.

Only isolated cases of this so-called sleeping sickness are likely to occur among American service personnel in the future, Gray says. Army medical authorities have made American bases virtually mosquito-free islands. Gray pointed out that no cases have occurred among service personnel in Japan this year.

Reasons for the absence of any cases are that the number of cases among the Japanese was low this year, and mosquito control and vaccination appear to be effective countermeasures.

Science News Letter, October 19, 1946



NEW SKULL—Dr. Dale Stewart, anthropologist of the Smithsonian Institution, inspects the skull he has remodeled. The skull at the right is the original crudely reconstructed one.

MEDICINE

Q Fever Is Widespread

It is believed that an outside carrier of this disease exists, possibly mites. Better methods of diagnosis must be developed.

► THE "Q" in Q fever may well mean questions unanswered.

Widespread outbreaks of the disease, often diagnosed as influenza or a form of virus pneumonia, suggest that better methods of detecting the disease must be developed, warns an editorial in the *Journal of the American Medical Association* (Oct. 12).

Studies of an epidemic of Q fever among troops returning to the United States from Italy showed that approximately one-third of a group of 1,683 soldiers was infected. Although no proof of the course of infection or mode of transmission could be found, it was believed that an outside carrier existed.

Outbreaks among troops in Italy, Greece, and Corsica suggested that mites riding on particles of dust from hay and straw may carry the Q fever germ. Ticks infected with the germ, *Rickettsia burneti*, have been found in many parts of the United States. Whether pigeons, rats, mice, cattle and lower animals serve as reservoirs of infection is another unsolved question.

Further evidence that the disease is more widespread than originally believed came from an outbreak of Q fever among laboratory workers at Fort Bragg. In this outbreak the principal source of infection was believed to be infected egg embryos with the germ spread by airborne droplets.

Diagnosis of Q fever is complicated by the similarity of the germ to the pneumonia virus and other filtrable viruses. The rickettsia germ passes through filters like a virus, but it is large enough to be seen under the microscope. The Australians who discovered the infection in 1935 dubbed it "Q" fever, a kind of pneumonia. The exact relation between Q fever in Australia and viruses of atypical or virus pneumonia in this country offers another question for further investigation.

Symptoms of Q fever may include fever, chills, sweats, weakness, muscle aches, frontal headaches, chest pain, occasional mild abdominal cramps and diarrhea.

Science News Letter, October 19, 1946

EDUCATION

Navy Science Cruisers

Ninety-one science-minded high school boys study science afloat, sailing with the U. S. Navy for four days on Atlantic course.

See Front Cover

➤ THE DREAMS of millions of American youths came true for 91 science-minded high school boys selected as the first Navy Science Cruisers to sail with the Navy for four days, studying science afloat in Uncle Sam's fleet. The unique cruise that packed excitement with education was sponsored by the Office of Naval Research, aided by Science Clubs of America, administered by Science Service.

A group of the science cruisers is shown by the 16-inch guns of the USS Washington on the front cover of this SCIENCE NEWS LETTER.

Chosen by local scientific organizations for their interest and ability as young scientists, cruisers from New York, Pittsburgh, Providence and Philadelphia flew to Washington in Navy planes to join a group from Washington, Sunday, Sept. 29.

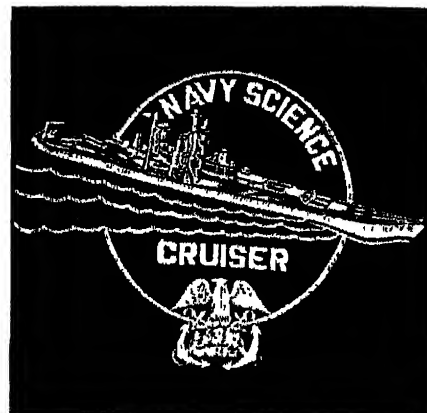
Traveling to Annapolis by bus, the boys took small boats out to the USS Randolph, historic aircraft carrier that served as Admiral Mitscher's flagship when he commanded the famed Task

Force 58 in the Pacific during World War II.

Navy specialists took the boys on tours of the ship, explaining details of the multiple scientific applications that make a modern fighting ship, but the big thrill for the cruisers came Monday morning as the ship ploughed out 100 miles into the Atlantic off Cape Henry. As the giant floating air terminal steamed into the wind, eight of her aircraft took off to start a two-hour air show that included qualifying landings for some of the pilots and was climaxed by a mock attack on the ship by fighters and bombers.

After the USS Randolph docked at Yorktown, Va., the boys went ashore Tuesday morning to mix history with their science on tours of historic Yorktown and colonial Williamsburg. That afternoon it was "back to sea" aboard LCI's, Landing Craft Infantry, that took the cruisers out into Chesapeake Bay to board battleships. The party was divided; one group sailed on the USS Washington and the other on the USS North Carolina.

Cruising up the Atlantic Coast to New York, the young sailors got their first



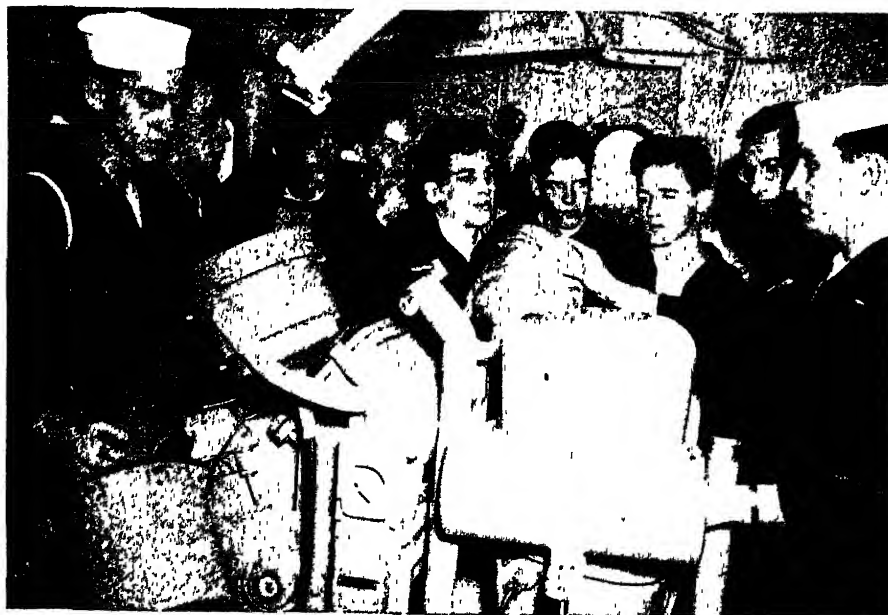
BADGE—This brassard was worn by the high school students that sailed as Navy Science Cruisers

taste of gunfire as the big battleships fired some of their batteries. At night, signal pyrotechnics were mixed with tracer fire from the guns as searchlights played against the clouds.

Landing in New York Thursday morning, the boys went to Floyd Bennett Naval Air Station to board planes that took them to their home cities.

After nearly five days in the Navy, the cruisers admitted that they had been thrilled by the planes and guns, but most of them had found other interests too. Young engineers had learned about the giant turbines that power the Navy's capital ships. High in the superstructures, they had seen the electronic equipment that brought victory in battle and

(See next page)



SHIPBOARD SCIENCE—Navy Science Cruisers inspecting steering equipment in the wheelhouse of the USS Washington at sea.

MEDICINE

Iron-Binding Compound Is Found in Human Blood

➤ DISCOVERY of an iron-binding component in human blood may lead to new treatments for some kinds of anemias and to new attacks upon some diseases like dysentery.

Following up finding of a protein in white of egg that has an affinity for iron, Dr. Arthur L. Schade and Leona Caroline of the Overly Biochemical Research Foundation, New York City, report the presence in human plasma of a similar substance.

In a communication to *Science* (Oct. 11), they suggest that this substance regulates the absorption of iron from the food tract as well as the transport of iron by the blood throughout the body.

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LEARNING HOW—Navy Science Cruiser Keith Seegmiller, (left) 16, a Washington, D. C. high school senior, learns the signals that bring airplanes down safely on the deck of the USS Randolph with the flight deck officer as his teacher.

opened new fields for peacetime advances. Behind the menacing barrels of giant guns lay intricate scientific instruments. On the flight deck of the aircraft carrier they saw the catapults and landing gear that may do important jobs ashore at future airports.

Newspapers cooperating with Science Clubs of America on the Navy Science Cruiser program included The Washington Daily News, Providence Journal, Pittsburgh Press and the New York World Telegram.

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PLANT PATHOLOGY

Disease Kills Citrus Trees

➤ AN ANNIHILATING disease of citrus fruit trees, that sweeps through orchards like fire and unsparingly kills every standard-grafted orange, grapefruit and tangerine tree it touches, was described by an eminent Brazilian plant pathologist, Dr. Agisilao Bitancourt of the Institute Bionomico of Sao Paulo, before an anxious audience of U. S. Department of Agriculture scientists.

"Tristeza" is the name of the disease; the word means "sadness" in both Portuguese and Spanish. It is highly appropriate, Dr. Bitancourt commented: the trees surely look sad as they stand wilting and dying, and the hearts of their owners are sadder still.

Already at least half of all citrus fruit trees in southern Brazil, northern Argentina, and the small countries of Uruguay and Paraguay have been attacked. Many are dead, and the rest

doomed without reprieve. There are indications of its possible existence in this country, but the case is still not proved.

Tristeza is a unique plant disease: it will not attack any tree that stands on its own roots; its only victims are orange, grapefruit and tangerine trees grafted on sour-orange roots. Sour orange, an inedible citrus species, has long been used as standard grafting stock because of the hardness of its roots and their resistance to diseases—until tristeza came along.

When tristeza hits a tree, nothing much may happen at first. Then it starts into a swift decline, its leaves wilting and dropping off, and its rootlets rotting away. Before long it is dead.

Chemical analysis of bark and wood near the place where the two grafted parts are joined shows plenty of protein and carbohydrate above the line,

none below it. Something about the disease prevents the foods prepared in the tree's top from getting down to its roots. Victims of a physiological traffic jam, the roots starve to death. Then the top dies from lack of water and minerals. It is about the same thing that happens to a tree that has been ringed or girdled.

There is some reason to believe that tristeza is caused by a virus, one of those strange nearly-living proteins whose big, complex molecules can pass through fine porcelain filters. There is some evidence also that it is carried from tree to tree by an insect. But thus far the virus has not been isolated, nor has the vector-insect been identified. Those are two of the problems on which American scientists, who have gone to Brazil to establish our first line of defense there, are now working side by side with their Brazilian colleagues.

It is highly important that the cause of tristeza be identified soon, Dr. Bitancourt declared in closing, because no known method of plant quarantine will avail to keep it from spreading to a new country.

Science News Letter, October 19, 1946

BOTANY

"Lost" Species of Rubber Tree Is Rediscovered

➤ A "LOST" SPECIES of Brazilian rubber tree, small, stiff of leaf, scanty of sap but hardy and tough, has been rediscovered on the thin soils of half-barren granitic hills in the upper Amazon valley by botanists of the U. S. Department of Agriculture.

The species was first studied and described by Richard Spruce, a British botanist, about 100 years ago. He named it *Hevea rigidifolia*, for its stiff leaves. The widely cultivated plantation rubber tree is *Hevea brasiliensis*. After its first discovery, no one saw it again until the American scientists pushed into its remote habitat recently.

This stiff-leaved *Hevea* appears at first glance to be not much better than a poor relation of the cultivated species, for it has not enough rubber to pay for extraction. However, the qualities of toughness and resistance to both drought and disease that enable it to survive on its hard-bitten hills may prove to be just the touch of plebian blood needed to add strength to the family stock of the rich but not-too-robust *Hevea brasiliensis*.

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CHEMISTRY

Fluorine Research Leads to Making of New Compounds

► WARTIME IMPROVEMENTS in the technique of preparing fluorine, exceedingly active gas related to chlorine, are already resulting in the first commercial productions of fluorine compounds hitherto regarded as chemically possible but commercially impracticable. Two patents, 2,408,784 and 2,408,785, cover a process for preparing anhydrous monofluorophosphoric acid, an ingredient of effective insecticides, and useful also in certain reactions as a catalyst.

All that is necessary is to mix four or five parts of thoroughly dry metaphosphoric acid with anhydrous hydrofluoric acid, with careful precautions to exclude all moisture, and then shake at room temperature or warm gently. The resulting compound is a clear, oily liquid that somewhat resembles concentrated sulfuric acid. It becomes a glassy solid at a little below minus 30 degrees Centigrade.

Willy Lange and Ralph Livingston of Cincinnati, who claim that this compound has never been successfully prepared before, have assigned their patent rights to the Ozark Chemical Company.

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MEDICINE

Milk May Help Prevent Cancer of the Liver

► FRESH MILK may play a part in preventing cancer of the liver, Dr. Cornelia Hoch-Ligeti of the Royal Cancer Hospital, London, England, suggests in a report to the American Association for Cancer Research.

Rats that got some fresh milk to drink daily were protected to a considerable extent from the development of liver tumors which these animals get when fed a cancer-causing dye.

Translating results of experiments with rats to terms of human disease is dangerous, Dr. Hoch-Ligeti points out. But cancer of the liver occurs very frequently in Africa and certain parts of Asia. Diet habits differ among inhabitants of these regions and complete information on how much milk they drink is lacking. It seems unlikely, however, that drinking milk is a daily habit of these people.

Lack of milk in the daily diet may not be the only cause of liver cancer in man. Rats on deficient diets did not develop

cancer. It took the combination of the poor diet and the cancer-causing dye to produce the cancers. Similarly in man, Dr. Hoch-Ligeti suggests, some cancer-causing agent may be concerned but its effect blocked by fresh milk in the diet.

Whatever it is in milk which protects the rats and maybe man from a liver-cancer-causing agent is not known. Apparently this unknown is destroyed when milk is dried.

Dr. Hoch-Ligeti is going to carry out further experiments to clear up the mechanism of the protecting effects of milk.

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SEISMOLOGY

Santo Domingo Earthquake Continues Disturbances

► THE SANTO DOMINGO earthquake series which is still going on more than two months after the shock of Aug. 4, bids fair to set a record as one of the really outstanding earth-disturbances of the present century. A new quake in the same region, at 9:45 a.m. EST, on the morning of Oct. 4, was nearly or quite equal to the original shock of Aug. 4, according to measurements of instrumental records made by seismologists of the U. S. Coast and Geodetic Survey.

The Aug. 4 and Oct. 4 shocks were both at least as violent as the one that initiated the destruction of San Francisco in 1906, the seismologists said. Only two earthquakes since 1904 have been stronger. The first, in 1906, was on the Colombia-Ecuador boundary; the other took place in Tien Shan province of China in 1911. The one reason why the capital of the Dominican Republic, Ciudad Trujillo, has not suffered more damage from the almost continuous trembling of the earth is that the epicenter, or point of greatest disturbance, is under the sea some miles off the coast.

Experience with this notable earth-shock series has stimulated Dominican authorities to set up a seismological observatory of their own, which they have hitherto lacked. They now have a temporary station, replacing one which was maintained by the U. S. Coast and Geodetic Survey for a time. They plan, however, to make a permanent installation, and also intend to send students to study seismology in the United States.

Science News Letter, October 19, 1946

IN SCIENCE

INVENTION

Simplified Traffic Light Eliminates Time Switches

► A TRAFFIC light that operates with only four electric lamps, eliminates the amber warning signal, and needs no time switches is the subject of U. S. patent 2,407,382, granted to Frank T. Powers of Glen Cove, N. Y.

Instead of having fixed lamps that are lighted and extinguished by the operation of time switches, the new device has two pairs of lamps, mounted at right angles on a shaft that is turned at the proper time intervals by a motor-driven mechanism in the base. Each lamp is enclosed in a parabolic reflector, with a red or green lens or filter over its face. It is unnecessary to have an amber warning signal with this setup, the inventor states, because just before the light changes, both colors are momentarily shown, one above the other.

Obviously, with this system, two positions for the two light colors would not be necessary. It would seem desirable, however, to retain a two-position system because color-blind drivers depend on the position rather than the color of the light for their traffic information.

Science News Letter, October 19, 1946

HERPETOLOGY

Rattlesnake Dies from Bite of Rattlesnake

► RATTLESNAKES are not immune to each others' poison, as is often claimed. Fresh evidence on this point is offered by Dr. H. K. Gloyd and W. A. Bevan of the Chicago Academy of Sciences.

Two Great Basin rattlesnakes in the Lincoln Park Zoological Garden in Chicago, they state, somehow got into a fight, and each struck the other several times. One of them, which had been bitten on the head and also on the body near the spleen, was found dead the following morning. The other suffered a badly swollen head and neck and showed signs of great distress lasting until the next day, but finally recovered.

Science News Letter, October 19, 1946

E FIELDS

MEDICINE

Chewing Paint on Toys Is Not Poisoning Risk

► PAINT-CHEWING children run no risk of lead poisoning, unless they attack the paint on the outside of the house, Felix E. Wormser, secretary of the Lead Industries Association, told the seventh annual Congress on Industrial Health in Boston. Cribs, toys and furniture that babies are likely to chew are not painted with white lead paint.

Lead hazards in industry and to the public are on the downgrade, thanks to modern safety precautions, Mr. Wormser said.

Prompt X-ray examination of persons stricken with convulsions and nausea will tell whether they have lead poisoning and will lessen the poison toll.

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AGRICULTURE

Methoxone, Weed-Killer, Increases Britain's Crops

► METHOXONE, a weed-killing chemical related to the 2, 4-D now being used in the United States, has shown itself able to increase the per-acre yield of wheat, in extensive field tests carried on in Britain during the past three years. Mobile dusting units have applied the compound to not less than 13,000 acres, which have returned harvests stated to average 22% greater than those from untreated fields.

It is known that similar experiments with 2, 4-D have been conducted on grain fields in Canada and the United States; but the more extensive tests in Britain have been spurred by the necessity for obtaining maximum food returns from this country's much smaller producing area.

The value of Methoxone as a weed-killer was discovered almost by accident, during the course of experiments on the nature of growth-promoting substances at Jeallot's Hill, one of England's leading agricultural research stations. It was found that a considerable number of these substances killed certain plants if used in sufficient concentration, but left others unharmed. Notable among the unharmed plants were members of the grass family, which includes all

grains. By a fortunate circumstance, among the most easily killed weeds are members of the mustard family, to which belong such plants as the charlocks, treacle mustard and pennycress, among the worst grainfield weeds in Britain.

It is hoped that Methoxone may prove useful also in combating malaria and the mosquito pest generally, by keeping down water-weed growths that make favorable conditions for the breeding of certain mosquito species.

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TEXTILES

Army All-Purpose Coat Shuts out Water, Wind

► THE POSTWAR Army has a new all-purpose coat designed to repel water and resist wind. Now under test by the Quartermaster Corps is a new trench coat with removable lining and leg attachments to protect trousers.

With an inner shell of five-ounce poplin and an outer shell of nine-ounce sateen, the coat has a liner of 21.5-ounce napped wool. The leg protectors are made of sateen and can be folded up and buttoned inside the coat when not being used. In use, the leg attachments are fastened with zippers.

The coat weighs seven-and-one-half pounds with the lining and five pounds without it. Eleven sizes of the new garment for both enlisted men and officers are being ordered, the Quartermaster Corps reported.

Science News Letter, October 19, 1946

HERPETOLOGY

Frogs Develop "Leprosy" When Kept in Aquaria

► FROGS DEVELOP a disease resembling human leprosy when kept in aquaria, Dr. S. Meryl Rose, of the Smith College zoology faculty, reports in *Science*, (Oct. 5). First symptoms are persistent sores on the toes and red spots on the legs. As the disease progresses, the flesh begins to fall away, and sometimes entire feet are lost. Nervous function is seriously impaired.

The disease can be prevented, Dr. Rose states, by keeping the frogs in water containing fifteen hundredths of one per cent of salt.

Science News Letter, October 19, 1946

BACTERIOLOGY

Colistatin Joins Other Antibiotics Against Germs

► DISCOVERY in soil of a new anti-germ chemical that may take its place with the famous antibiotics, streptomycin and penicillin, is announced by G. F. Gause of the Institute of Tropical Medicine, Moscow, in *Science*, (Sept. 27).

Colistatin is the name Dr. Gause gives the new antibiotic. He chose this because the substance stops the growth of a germ called *Bacterium coli*. Colistatin is produced by a bacillus found in black earth or chernozem soils.

Germs of pneumonia, one kind of dysentery, a paratyphoid germ and staphylococci are also stopped by colistatin. Unlike streptomycin, this new antibiotic merely checks the growth of the germs and does not kill them.

Science News Letter, October 19, 1946

AERONAUTICS

Sandwich Construction Will Decrease Expense

► SANDWICH construction in aircraft will make family airplanes inexpensive, the International Congress of Applied Mechanics was told by Dr. Nicholas J. Hoff of the Polytechnic Institute of Brooklyn, N. Y. The low cost is due to the fact that cheap materials such as paper and cork can be used in the sandwich core.

Sandwich construction, usable in the fuselage and supporting surfaces, is made of two thin layers of high strength material between which is a thick layer of an ultra-light core. The faces may be plywood, paper or aluminum alloy; the core is cork, balsa wood or a spongy synthetic material. They are held together with a special glue. Fabrication is rapid; the face, core and glue are put into a mold under pressure and heated for about 20 minutes to set it.

Sandwich type construction eliminates the network of reinforcing elements necessary in today's aluminum planes in which the construction involves a tremendous amount of riveting, Dr. Hoff declared. It has better aerodynamic properties than are possible in the present aluminum construction in high-speed aircraft, he asserted, and greater durability than is possible in fabric covered planes in light aircraft.

Science News Letter, October 19, 1946

ENGINEERING

Save Fuel By Saving Heat

Closing cracks, insulating walls, and cleaning the furnace are ways of stretching the fall fuel supply. Results from heating research are told.

By A. C. MONAHAN

➤ FUELS for heating will dig deep into the family budget this year but, in the average home, increased costs can be offset by cutting fuel and heat waste.

Smoke-belching chimneys show a waste of natural resources and family funds. Rattling windows and doors indicate the householder is trying to heat up the great outdoors. Proper furnace management will consume the smoke, adding to the heat for the house. A little carpentry, or even old rags, will close the window cracks that permit the rattling and at the same time let the heat escape.

Even in homes without smoking chimneys and rattling windows there are usually many invisible heat losses. Combustible gases generated in the fire pot, unless consumed in the furnace, pass up the flue and their potential heat is lost. Also, in most houses, there are hard-to-find crevices through which hot air escapes. There are tremendous losses through walls not properly insulated and windows without outer storm sashes.

Research on Heating

House heating, incidentally, if comfort and economy are major considerations, is not a simple matter. Scientists and heating engineers are devoting their lives to heating problems. Much money is spent annually in university and engineering laboratories to discover methods of construction which will insure greater comfort to occupants in summer and winter, and better ways to obtain full value of the fuels used.

In recent years, with research pushed by fuel shortages, several fuel-saving furnaces and stoves have been developed, thermostatic heating controls improved, chimney construction studied, new fuels from waste products fabricated and heat distribution methods investigated. Most of the findings are for new homes, or future installation in old homes.

Present householders this winter will use the same old furnaces, with the same

old fuels, in the same old houses. There are steps that they can take, however, to save fuel that will help out in this year's budget.

Any householder can get plenty of hints and suggestions for furnace management, heating and heat-saving from many sources, including government agencies. Associations representing heating and ventilating engineers, and others representing the anthracite, the bituminous coal, and the fuel-oil industries, give particularly helpful hints. The advice given is not hit-or-miss, but results from scientific studies and tests.

Fundamentals in home-heating economy include three often-repeated essentials that should be taken care of before the furnace turns from summer idleness to winter use. These are cleaning the heating surfaces within the furnace, filling the crevices in the building through which heat escapes, and having windows fitted with storm sashes.

Soot and hard carbon deposits on the flues within the furnace in which steam is generated or water heated can cut down the efficiency of the furnace as much as 30 per cent. Tight houses, with

storm windows and doors, require up to 40 per cent less fuel than similar houses not so protected from heat losses.

Wall insulation, including insulation material in the roof and attic floor, is regarded by many as another essential, but one that the average home-owner can not install himself. University of Illinois scientists state, after several years of study and actual testing, that five times as much heat is transmitted through an uninsulated wall as through an insulated wall.

Experimental Houses

This Illinois state institution is among several that are making fundamental studies of home-heating. It has two houses on its campus used for the purpose, and at the present time is building a third. One is a two-story-and-attic colonial house, in use 22 years in studying warm-air heating. Another is heated with a boiler and radiators. The one under construction is a five-room one-story structure of the usual type being built today. It is to be heated by warm air.

The new home is a cooperative project of the University and the National Warm Air Heating and Air Conditioning Association. The university conducts the research; the association pays the bills. The house will be occupied by a non-research family so that it will get normal usage during the tests.

To show the thoroughness of the scientific studies made with these Illinois houses, each house has several miles of electric wiring built into it to connect 200 thermo-couples with a central switchboard. By these, temperatures are taken, not only in the various rooms, but within the walls, floors and roofing.

Chimney Construction

Chimney construction, it is found, has a definite bearing on furnace action. Various types of chimney materials and flue sizes are being investigated. The new house will have something new in chimney material; it will be made of molded asbestos instead of the customary brick, tile and mortar.

All studies in home-heating at the University of Illinois are not made in these special houses; some are made in mechanical laboratories. One develop-



FURNACE—Laboratory model of the new Williamson furnace, with draft system at rear, is being inspected.

ment to come from the engineering department is a smokeless bituminous coal furnace. It can be used with warm-air, steam or hot-water heating. Nearly 100 of them have been built by a manufacturer, and are now being tested in homes throughout the United States. Later, when testing is completed, it will be produced commercially.

Another smokeless furnace, developed by scientists of the Williamson Heater Company, employs principles identical with those employed in the production of coal gas. In this furnace, the gases released by heating and partial combustion can escape only by passing downward through the hot fuel bed, and thence upward through a series of so-called Venturi tubes positioned at either side of the grate. Secondary air, entering these tubes, insures complete combustion.

Other Houses for Study

The model houses at the University of Illinois, erected for home-heating studies, are not the only structures of the kind in the country. Commercial homes constructed by building companies have been used by national organizations of heating engineers in studies made under their sponsorship. Some houses, identical otherwise, were built with or without wall insulation, storm windows and other heat-saving measures, so that relative heat losses could be determined. One notable structure is a special home-like building erected to study automatic heat control.

This is a penthouse on top of one of the main buildings of the Honeywell Regulator Company's plant at Minneapolis. It is a two-story structure, 30 by 30 feet, built of average housing material, with 120 thermocouples buried in the walls. This penthouse experiment has resulted in a new automatic control system that regulates temperature within the house.

Heating engineers have long recognized that human beings are unsatisfactory detectors of temperature changes within a home. Control thermostats are in general use in houses heated by fuel oil or gas. Their use with coal burning equipment is much less common. These thermostats, located in a theoretical heating center of the house, work on the on-off principle. When the house is too warm, they shut off the flow of oil or gas; when too cold, they open up in full. The new type eliminates the on-off method, raising or lowering the heat



LABORATORY—New house is being built at the University of Illinois' Home Research Center in Urbana-Champaign to study warm air heating in a typical modern one-story house.

delivery to give constant inside temperatures that vary only a fraction of a degree.

Saving fuel in the home not only decreases the cost of living, but also helps preserve America's natural fuel resources. If 10,000,000 coal-burning homes save a ton a year each, it means a saving of 10,000,000 tons. If 1,000,000 oil-burners each use one barrel less, fuel oil for diesel power plants will be more plentiful, and so will be the supply of gasoline, because this essential aviation and automobile fuel can be made from fuel oil.

Petroleum Reserves

How long the known petroleum reserves of the United States will last at present rates of consumption is a matter of opinion, but estimates by experts vary from 15 to 50 years. Coal reserves will last many hundreds of years, geologists claim, but this does not mean that the better qualities will be available long. It is for this reason that scientists are so active in developing ways of satisfactorily using the poorer grades of coal and lignite.

Scientists are also active in preparing for use as home and factory fuels materials formerly regarded as wastes. As an example, sawdust and wood wastes from the great lumber mills are now being fabricated into blocks with a tar binder.

Waste coal "fines" are also being briquetted. Peat, now little used in America, may become a common fuel. In a European process, peat is masticated in water and formed into tubes which, when air-dried, become a clean

fuel suitable for use in homes.

Saving fuel to conserve natural resources for future generations may not be such an appealing argument to many home owners, but saving expenditures from the family budget is another matter.

Science News Letter, October 19, 1946

Tons of pure *fluorine* were produced for war purposes by the development of an electrolysis process, and special containers were made to store it; this chemical element in the past had defied man's efforts to harness it.

A *high-protein* diet of powdered milk and powdered eggs will bring starvation cases to health more rapidly than any other diet now known.

YOUR HAIR AND ITS CARE

By Oscar L. Levin, M.D.
and Howard T. Behrman, M.D.

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Do You Know?

The *black widow* spider is an extremely timid creature.

The chemical weed killer, 2, 4-D, does not harm cows

The rare gas *xenon* has narcotic effects on men, experimental work reveals.

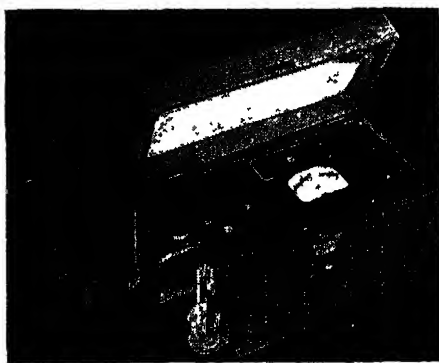
Most of the fertilizing elements in *wood ashes* are in an oxide form and have a sweetening effect on the soil.

One-fourth of the cultivated land under irrigation works constructed by the U. S. Bureau of Reclamation is used for growing *alfalfa*.

Dihydrostreptomycin is a new drug derived from streptomycin that is as active against germs as the older drug and has the added advantage of being more stable.



ATOM-SMASHING—Photographs taken by Dr. Wilson M. Powell, University of California physicist, show the disintegration of an atomic nucleus. Two photographs of the phenomena taken at different angles are shown. Each large point of the star represents an alpha particle. It is assumed that neutrons, which cannot be photographed, are being emitted in the direction away from the alpha particles. It is also assumed that the atomic explosion was caused by a neutron.



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Here's the pH Indicator for the man who is not necessarily a pH expert. It's portable and handy for any lab. It's sturdy and dependable and easy to use.

Instrument can be used with either thick or clear solutions at any temperature to 50C. It's affected neither by "sticky" weather (unless relative humidity is over 95 and ambient temperature is over 30C), nor by the electric fields of other nearby equipment.

Catalog E-96(2) gives further details.



Jrl Ad E-96(25e)

PHOTOGRAPHY

Nuclear Pictures Taken

► A PICTORIAL record of atom-smashing in nature, showing such basic subatomic events as the birth and death of basic particles of matter and the complete disintegration of nuclei, was published in the *Physical Review* by a young University of California scientist.

The photographs, probably the most dramatic ever taken of the primordial processes of the universe, were taken on top of Mount Evans, Colo., an altitude of 14,120 feet, where the frequency and intensity of cosmic radiation is much greater than at sea level.

The photographs were taken by Dr. Wilson M. Powell, associate professor of physics, during two expeditions in 1940 and 1941. The results were not published until recently because the war interrupted Dr. Powell's work.

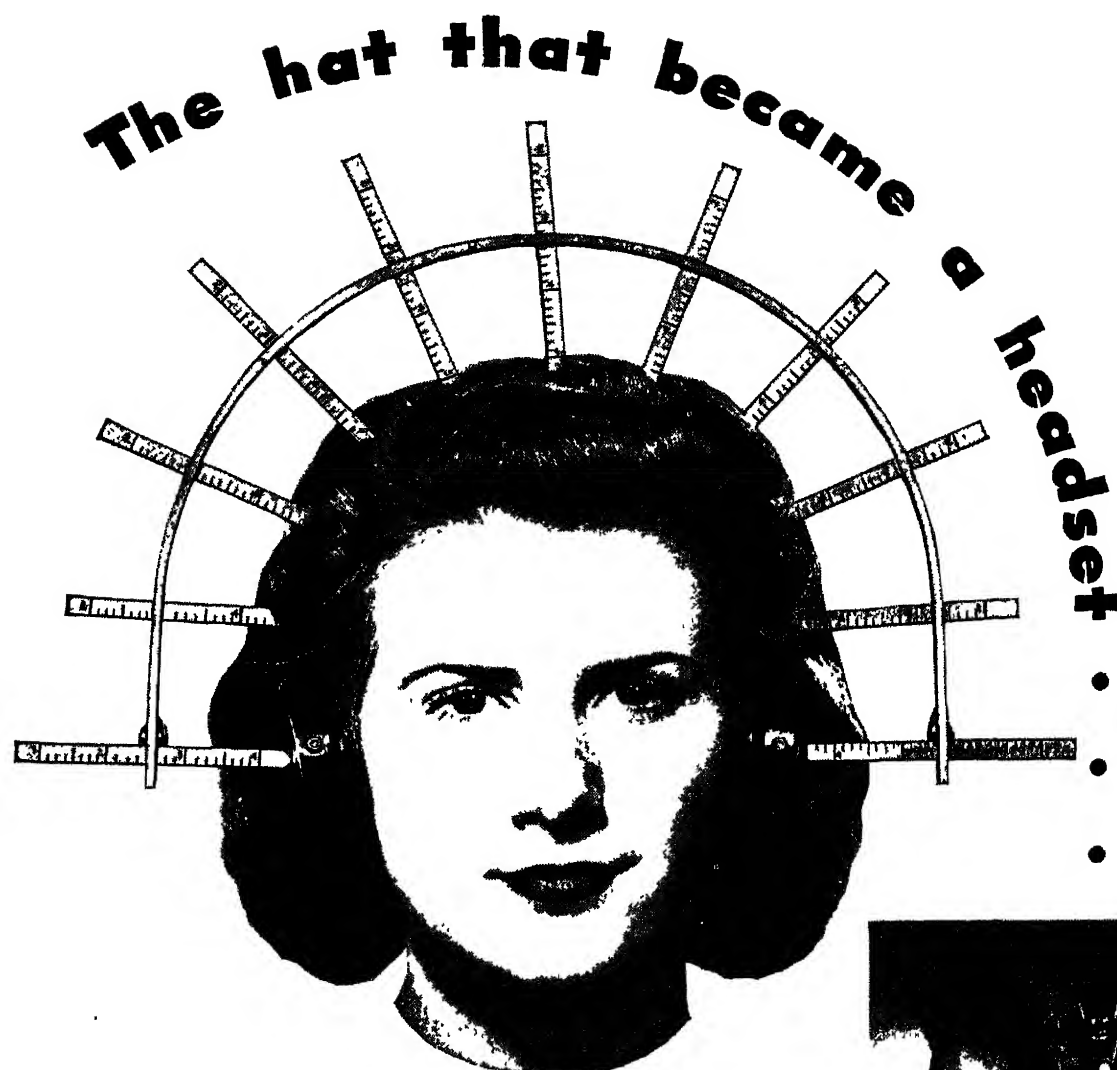
Dr. Powell found an enormous number of neutrons in cosmic rays at high altitude. These neutrons appeared to have a maximum energy of about 200,000,000 electron volts. Their presence was detected photographically only by the disintegration of nuclei. The sud-

den appearance of a star effect on the photographic plate, with fragments of the nucleus flying in all directions, was set down as the work of a high speed neutron.

The photographs were taken in Wilson cloud chambers, which were filled with argon gas. Five plates of lead were spaced in the chamber to scatter particles going through and to test the penetrating power of the particles. Angle of deflection and penetrating power are clues as to the type of particle making a particular track through the chamber.

Dr. Powell and other University of California scientists hope some of the remarkable subatomic events found in cosmic rays at high altitude may be reproduced in the laboratory when the big new atom smashing machines, the 4,000-ton cyclotron, the synchrotron and the linear accelerator, are completed on the Berkeley campus. Dr. Powell hopes to construct special equipment in which such man-made cosmic radiation may be observed in the laboratory under control conditions.

Science News Letter, October 19, 1946



Telephone operators in New York, Atlanta and Montreal wore the strange head-dress you see pictured above. It's a specially devised gauging instrument — Bell Laboratories scientists used it to measure head contours in designing the new operator's headset.

With the new set, the telephone user can hear the operator more clearly, and she in turn hears better too—through the improved receiver and transmitter. Her voice enters the transmitter at an even level because, as she turns, the

mouthpiece moves with her. Neckstrap and horn are eliminated. The whole thing weighs less than six ounces.

The new Bell System headset brings together the latest techniques in telephone voice transmission and the ideas of the operators themselves. It offers them comfort, convenience, and electrical efficiency.

Out of new knowledge has come this novel head telephone fitted to the operator and designed to improve your telephone service.



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EXPLORING AND INVENTING, DEVISING AND PERFECTING FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

BACTERIOLOGY

Block-Busters Blow Disease Germs Apart

➤ MICROSCOPIC block-busters exist which literally blow disease germs apart.

Discovery of this battle strategy of bacteriophage, a minute virus used to treat certain diseases, is announced by Dr. A. P. Krueger, professor of bacteriology at the University of California.

The death blow comes to disease germs within two or three hours after the virus establishes a beachhead within the cell. The virus grows 10,000 to 100,000 times, then bursts through the cell wall, Dr. Krueger estimated from a microscopic study of a bacteriophage attack on staphylococcus, the germ that causes boils.

Bacteriophage strategy interests scientists, because the organism is a simple example of the filterable viruses, others of which cause infantile paralysis and encephalitis.

Results of Dr. Krueger's studies appear in the *Journal of General Physiology*.

Science News Letter, October 19, 1946

AERONAUTICS

Pulsating-Jet Engine To Power Aircraft

➤ A SIMPLE PULSATING-JET engine will furnish cheap auxiliary power to conventional aircraft, can be used at the tips of helicopter blades, power pilotless aircraft and assist glider take-off, L. B. Edelman of the Navy Department has reported to the Society of Automotive Engineers. It is an engine of the type used in some of the Nazi bombs that fell upon London.

The engine as now developed is a simple powerplant, requiring only air, liquid fuel, a shaped tube, some form of check valve, and a sparkplug for starting. It can produce thrust, he said, of up to 900 pounds per square foot with fuel consumption of only about one and one-half pounds an hour.

The engine is economical, he continued, yields speeds up to one-half that of sound, requires neither expensive high-temperature alloys nor costly machining operations, and operates on any liquid fuel available without noticeable variation in performance.

Helicopters equipped with these engines at blade tips will be lighter and less complicated, he said.

Science News Letter, October 19, 1946



Down From the Trees

➤ MAN'S ANCESTORS may have got started toward becoming human simply by growing too big to hang around on the old family tree. If our remoter forebearers really were tree-inhabiting animals (whether they swung by their tails or not) they must have been relatively small. Very few animals that make their homes permanently in the tree-tops weigh more than 15 or 20 pounds, and most of them are much smaller—squirrel-sized rather than monkey sized. Among the heaviest are the sloths—and see how cautious they have to be, to avoid falling to the ground where the jaguars can get them!

True, we commonly picture the great apes, most nearly related to man of all the animals, as tree dwellers—but is the picture a correct one? Zoologists tell us that the biggest and in many ways most nearly human one of the lot, the gorilla, spends the greater part of its waking hours on the ground. Certainly no gorilla could leap nimbly from branch to branch, as the lighter-bodied monkeys do—the branches just couldn't stand the gaff.

The middleweights among the man-like apes, the chimpanzee and the orangutan, can manage an arboreal existence better than the massive gorilla, but even they are said to descend to ground level pretty frequently. Only the little gibbon, featherweight among anthropoids, is light enough to be completely agile in the treetops.

The less man-like among the apes, like the baboons and drills, are almost wholly ground-dwellers. They are highly agile, but their refuge is among rocks rather than in trees. However, they made the evolutionary mistake of remaining

four-footed—or even of becoming actually more quadrupedal than their putative monkey-like ancestors.

Any animal that comes down out of the trees to live upon the ground must necessarily leave the forest more or less behind. In the perpetual twilight that reigns on the floor of a mature, closed forest few food plants have a chance to grow. To find something to eat, the quondam treetop-dweller must haunt the streamside openings, the brush-grown clearings, the tapering edges of the forest—or even venture boldly into the open grassland. Away from tree cover, there is a premium on speed (hence, presumably, baboons and the like) or on an erect posture giving better scope for vision and more chance to let the fingered forefeet become hands—hence, perhaps, man.

Science News Letter, October 19, 1946

CHEMISTRY

Spectrograph Gives Fast Quantitative Analysis

➤ FASTER METHODS of analyzing metals, particularly the scrap collected from farms, homes and shops during the war, were found by the use of the spectrograph, and the processes promise to become routine practice in the future. Knowledge of scrap content is essential; a little tin in steel, for instance, makes it unusable for many purposes.

Details relative to the research conducted and the methods developed are now revealed in a report recently issued by the Department of Commerce, prepared by D. H. Deik of Johns Hopkins University. Though direct-reading photoelectric methods still present some problems, the fundamental processes underlying spectrographic analysis have now been worked out, he declares.

The report outlines the essential steps in the process. First, a sample of the metal is brought into a light source and partially vaporized by electrical excitation. The light becomes characteristic for the composition.

This light is sent through a spectrograph and the spectrum formed is photographed. This spectrum shows the lines characteristic of the metals included. The photograph, after developing, is analyzed in a micro-photometer, which measures the intensities of key lines. From these intensities, the amounts of the various elements are determined.

Science News Letter, October 19, 1946

METALLURGY

Calcium Carbide Removes Sulfur from Molten Iron

➤ SULFUR, the chemist's standby in a thousand operations, is one of the worst headaches of the metallurgist, particularly the worker in ferrous metals. It can cause sudden and unpredicted flaws and failures in iron and steel castings and forgings; and as a rule its presence in the walls of chemical reaction vessels is intolerable. But getting it out of raw iron is far from an easy job.

Among means suggested has been the use of fused calcium carbide. However, calcium carbide is very much lighter than iron, and its melting point is considerably higher. To overcome this dilemma, John J. Crowe of Westfield, N. J., puts his lumps of calcium carbide in a crucible with a closed top but an open bottom, which he suspends or floats on top of a ladle of molten iron. He melts the carbide by means of an electric arc, maintaining it at its own fusion point.

The continuous boiling motion of the molten metal brings every particle of it eventually into contact with the small mass of fused carbide, which soaks it up like a sponge, converting the sulfur into calcium sulfide. This rises to the top as a slag and may be removed.

Mr. Crowe has just been granted U. S. patent 2,409,020 on this process, and has assigned his rights to the Air Reduction Company, Inc.

Science News Letter, October 19, 1946

CHEMISTRY

New Variety of DDT Kills Mosquito Larvae

➤ A VARIETY of DDT that kills the larvae of malaria-bearing mosquitoes but is ineffective against adult mosquitoes, house-flies, and body lice has been discovered.

Of possible use in fighting mosquito wigglers in ditches and ponds where it is not desired to harm other insects, the substance is what is called an isomer or rearrangement of the atoms in the ordinary DDT molecule.

The unusual kind of DDT is mixed in with commercial production of the effective DDT. The researches are reported to *Science* (Oct. 11) by a U. S. Department of Agriculture group, Stanley J. Cristol, H. L. Haller, and A. W. Lindquist.

Science News Letter, October 19, 1946

Books of the Week

ANALYTICAL EXPERIMENTAL PHYSICS—

Harvey B. Lemon and Michael Ference, Jr.—*Univ. of Chicago Press*, 588 p., illus., diagrs, tables and charts, \$8. The authors have revised the book in the light of users' suggestions and new developments, largely stimulated through war work, in physics. The result is additions in the fields of radio, radar, nucleonics, isotopes, artificial radioactivity, and electrical units.

ANIMAL BIOLOGY—Robert H. Wolcott—

McGraw-Hill, 719 p., illus., diagrs, and tables, \$4. A beginning text of the biology of animals including man, it outlines the fundamental principles of physiology, microscopic and macroscopic structures, classification of the animal kingdom and the laws of evolution and heredity. Simple descriptive keys with many figures of all the orders of insects, birds, and mammals have been included.

CAREERS IN PHOTOGRAPHY—C. B. Neblette—

Ziff-Davis, 182 p., illus., \$2.50. A specific guide for everyone interested in the many opportunities in the photographic field, including suggestions for getting started in the profession and an outline of the training necessary for success.

A CENSUS OF THE DETERMINABLE GENERA OF THE STEGOCEPHALIA—E. C. Case—

The American Philosophical Society, 420 p., diagrs, charts, and tables, paper, \$1.25. Transactions of the American Philosophical Society for promoting useful knowledge. New series—Vol. XXXV, Part IV.

HOW BIG IS BIG? FROM STARS TO ATOMS.

A Yardstick to the Universe—Herman and Nina Schneider—*William Scott, Inc.*, 42 p., illus., \$1.50. This book is the much-needed answer to the challenging questions all children ask about size. The authors have cut the concepts of bigness and smallness down to a seven-year-old's size and experience level.

HUMAN FACTORS IN AIR TRANSPORT DESIGN—Ross A. McFarland—

McGraw-Hill, 670 p., tables, graphs, illus., and diagrs., \$6. The book represents an unusually complete compilation and interpretation of biological data which the aeronautical sciences can use to improve the efficiency of air crews and the safety and comfort of air travelers.

THE MYTH OF THE STATE—Ernst Cassirer—

Yale Univ. Press, 303 p., \$3.75. In this book the author has been able to bring together the great resources of learning and insight that accumulated over a long lifetime, and to examine one of the central problems of modern man. This is a vastly learned book that can be read by the general reader with no special training in philosophy or the other disciplines the author makes use of.

OCEAN ATMOSPHERIC-ELECTRIC RESULTS—O. W. Torrey, O. H. Gish, W. C. Parkinson, G. R. Wait—

Carnegie Inst., 178 p., charts, graphs, tables and illus., \$2.25 paper, \$2.75 cloth. Scientific Results of Cruise VII of the *Carnegie* during 1928-1929 under Command of Captain J. P. Ault. Publ. 568.

SOME COMMON MUSHROOMS AND HOW TO KNOW THEM—Vera K. Charles—

U. S. Dept. of Agr., 60 p., illus., paper,

20 cents. Circular No. 143.

TEXTILES OF HIGHLAND GUATEMALA—Lila M. O'Neale—

Carnegie Inst., 319 p., 130 illus., \$5 paper, \$5.50 cloth. Publ. 567.

WHAT'S IN THE TRUNK?—Irene Lorentowicz—

Roy Pub., 28 p., illus., \$1.50. This is a picture book with a surprise. The story is about two children wondering what their father, who is a pilot, sees all over the world. When he comes home one day, they find out. Children of all ages will enjoy the various national costumes which are depicted in the story.

Science News Letter, October 19, 1946

ASTRONOMY

Ninth Magnitude Comet Is Spotted in Cetus

➤ A FAINT COMET has been spotted in the constellation of Cetus, the whale, now visible in the southeast. According to a cablegram received at Harvard Observatory from Dr. J. S. Paraskevopoulos, superintendent of Harvard's Southern Astronomical Station, the comet is of the ninth magnitude, far too faint to be seen with the naked eye or binoculars.

The heavenly object may be known as Comet Bester after its discoverer. Or it may be found to be the recurrent Comet Temple 2, scheduled to revisit the vicinity of the earth this fall. Calculations show that Comet Temple, last seen in 1930, is due to be in the constellation of Cetus at this time. The comet made a fairly close approach to Jupiter in 1943, and it may be that the planet pulled it slightly off its course. This accounts for the fact that it was found away from its predicted position.

Science News Letter, October 19, 1946

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SCIENCE NEWS LETTER

1719 N St., N.W., Washington 6, D. C.

•New Machines And Gadgets•

☼ **CARVING AID**, to hold the ham or turkey being served, is a finished wood platter with an upright metal post that carries a movable arm. The arm, arched upward, extends over the meat, and can be lowered so that sharp points on its under side engage the roast.

Science News Letter, October 19, 1946

☼ **BABY HOLDER** keeps a sitting infant from falling out of his chair. It is a single piece of cloth, with two holes through which the baby's legs project. Fitting around the front and under the body, it is tied by cords to the back of the seat.

Science News Letter, October 19, 1946

☼ **ANKLE BRACELETS** for professional dancers throw light upward over the calves of the legs from tiny concealed electric tubes. Each bracelet consists of a ring of insulating material within which is a series of dry cells separated by the bulbs.

Science News Letter, October 19, 1946

☼ **COMPRESSED coffee cakes**, each intended to make three cups of coffee, are marketed in heat-sealed cellophane to keep the flavor fresh. With air and water extracted, the cakes occupy slightly more than half the space required for the loose material.

Science News Letter, October 19, 1946

☼ **CAMERA TRANSIT**, for use in



surveying land, combines a camera of special design and a surveyor's transit. The camera is inserted, as shown in the picture, between the top of a tripod and the transit telescope. The optical axis of the telescope is parallel to that of the camera.

Science News Letter, October 19, 1946

☼ **INFRA-RED radiation detector**, a small instrument easily carried by a soldier, picks up and makes invisible infra-red signals visible, but does not form images as in the snooperscope. A lead-

sheathed compartment within contains radioactive material, the power source of the device.

Science News Letter, October 19, 1946

☼ **PIN-CUSHION wristlet**, homemade, is a pad an inch thick and three inches long, filled with wool clipping, and held on the back of the wrist with an elastic band. It is especially useful in hemming and fitting, where the pin supply should move with the worker.

Science News Letter, October 19, 1946

☼ **NEW ERASER** takes away particles from the surface as created. A circular eraser is connected by a flexible tube to a stand on the table which contains a suction fan. As the power-driven eraser revolves, the particles are drawn through the tube to a receptacle.

Science News Letter, October 19, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 333. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

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Question Box

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ASTRONOMY

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Can a rattlesnake poison another rattlesnake? p. 248.

SEISMOLOGY

How does the Santo Domingo earthquake compare with other great quakes? p. 248.

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Of what danger to frogs is keeping them in an aquarium? p. 249.

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13 MAR 1952

SCIENCE NEWS LETTER



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THE WEEKLY SUMMARY OF CURRENT SCIENCE • OCTOBER 26, 1946



A SCIENCE SERVICE PUBLICATION



The RCA Electron Microscope's magnifying power is now doubled—from 100,000 to more than 200,000 times!

A new weapon "pointed at the heart" of tuberculosis!

This improved RCA Electron Microscope can recognize 50,000 distinct particles in the width of a hair!

Through such magnification, never before possible, science can now examine the structure of the tuberculosis bacillus (shown above)—in its vital search to learn why these organisms behave the way they do.

Until the electron microscope came to the aid of disease fighters, scientists had seen this bacillus only as pin-point specks in optical microscopes. Today they can examine the membrane, body structure and details of this killer.

New knowledge of the fine structure of

viruses and living cells will also be of inestimable value in the battle against still unconquered diseases.

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GENERAL SCIENCE

Academicians Visit USA

American Philosophical Society and National Academy of Sciences entertain foreign scientists at their fall meetings in Philadelphia and Washington.

Highlights of the Philadelphia meetings are in this issue and the next issue will contain reports of the Academy sessions in Philadelphia and Washington.

➤ A UNITED NATIONS in science, comprising 34 official representatives from the Academies of Science of foreign countries, was a feature of the autumn meeting of the American Philosophical Society in Philadelphia. The group, forming the largest and most distinguished body of overseas scientists to visit America since the war, also attended the meeting of the National Academy of Sciences, the first two days of which were moved from Washington to Philadelphia due to the Washington hotel strike.

There was some whispering of an "Eastern bloc" when the Academy of Sciences of the USSR failed to appoint a delegation, and when a duly appointed Polish delegation failed to leave Warsaw. However, it is pointed out in refutation that three countries usually considered as within the Soviet "sphere of influence" — Czechoslovakia, Hungary, and Rumania—all had their representatives here.

Oldest organization represented is Italy's Accademia Nazionale dei Lincei, organized in 1603; youngest is the Argentine Academia Nacional de Ciencias Exactas, which dates from 1937. Countries whose national academies were represented included Great Britain, France, Sweden, Denmark, Belgium, Hungary, Switzerland, Australia, Norway, New Zealand, Canada, Mexico, Peru, Brazil, Greece, China, India and Argentina.

Million Plants Unnamed

➤ ABOUT A MILLION plants are now known by name to botanists, Prof. Liberty Hyde Bailey, veteran Cornell University plant scientist, stated before the meeting. At that, the task of botanists is less than half accomplished, for he estimates that at least another million plant species await naming and exact description.

This situation makes a sharp contrast

with the botany of less than two centuries ago, when the great Swedish naturalist Linnaeus believed that the total number of plant species in the world was not greater than 8,000. In the second edition of his classic *Species Plantarum*, published in 1763, he described 7,540 of them.

Exact knowledge and description of plant species is important, the speaker declared, if the applied plant sciences, such as agriculture, horticulture, forestry and pharmacology are to make progress. Of two plants that look almost alike yet are distinct species, one may be useful in breeding and the other useless, or one may be poisonous and the other harmless.

Of great importance, however, is the confident knowledge of the kind of plant you are dealing with when you are carrying on basic research in other plant sciences like genetics or physiology, leading eventually to an understanding of the mystery of photosynthesis and the origin of life.

USSR Starts Health Plan

➤ SOVIET MEDICAL and public-health authorities have a five-year plan for improvement of health conditions in the USSR that includes several bold pioneering ventures in the medical field. These were outlined before the American Philosophical Society by Prof. Stuart Mudd of the University of Pennsylvania medical school, recently returned from a month's visit in Russia, where he interviewed about 200 doctors and public health workers.

Among the programs which he saw in actual operation were preparation of bacteriophage for combating diarrhea in children, use of the Kluyeva-Roskin "solvent" treatment for cancer, and preparation of BGG anti-tuberculosis vaccine for use on babies throughout the USSR. Pushing forward in the classic researches on neuro-psychological problems started years ago by Pavlov, Russian neurologists and psychiatrists are making use of their results in the prevention and management of mental dis-

case.

While the program as laid down is comprehensive, special attention is being paid to problems connected with the health of children and the physical and mental rehabilitation of war veterans. Basic research is also coming in for generous support.

Prof. Mudd declared in conclusion: "Good will exists between scientists of the two countries who have had the opportunity for personal acquaintance. It is my earnest belief that the good of both countries demands the future broadening of the basis of mutual understanding and good will."

Race Problems

➤ PROGRAMS for the abatement of race prejudices are often laid out with much enthusiasm and good will, but because their sponsors do not make use of known principles of psychology and the social sciences they work out the wrong way, declared Donald Young, executive director of the Social Science Research Council. A few social scientists working independently and two or three leading intergroup agencies have now begun scientific analysis of inter-



SHOOTING STAR—This meteor is one of the magnificent shower visible when the earth plowed through debris left by the Giacobini-Zinner comet on Oct. 9. The flash lasted only a few tenths of a second, as the meteor was speeding along at about 10 miles a second. The photograph was made with the four-inch Ross camera at the University of California by L. Salanave and S. Inglis.

racial problems.

The speaker warned against further unscientific efforts: "Continued failure to take full advantage of the potential contribution of the social sciences in developing and testing the necessary techniques is inexcusable in view of the urgency of the problem of developing more rational race relations and the tremendous expenditure of time and money in efforts directed towards its solution."

Research in America

➤ AMERICAN medicine remained "colonial" long after the Colonies had become a nation, Prof. Richard Harrison Shryock of the University of Pennsylvania stated before the meeting. That is, medical men depended on Europe for a proper finish to their training, and especially for fundamental research.

Prof. Shryock thinks this was partly due to a Victorian revulsion to "cutting dead people open" in autopsies, partly to "the indifference of a commercially-minded people to any science that did not possess immediate utility."

However, once late nineteenth-century researches demonstrated that the "pure science" of earlier decades was proving of practical value, younger American medical men turned to research with great enthusiasm. At the same time, there was a lot of quickly-made money waiting to be used, and some of this got used in support of research. Research was long delayed in this country, but when it got started it developed with a rush.

Americans Good Observers

➤ BY FAR the greatest part of the outstanding astronomical observations have been made in America, while many of the major theoretical advances have come from overseas, Dr. Henry Norris Russell of Princeton University told the meeting. But astronomers of many nations have cooperated so closely in expanding our knowledge of the universe that their contributions are hard to untangle, he said.

The temperature and composition of the sun and stars, the sources of their energy, the dimensions and rotation of the galaxy and the vast realm of external galaxies have been disclosed by looking through the great refractors and special instruments such as a tower telescope and interpreting these observations in the light of theoretical advances.

Science News Letter, October 20, 1946

MEDICINE

Organization to Help Victims of Nerve Disease

➤ THE VICTIMS of a baffling and crippling nerve disease, their relatives, friends and doctors have banded together in an attempt to find weapons for conquering the malady, multiple sclerosis.

With Dr. Tracy Putman of the Neurological Institute of New York as honorary chairman, the new organization, called the Association for Advancement of Research in Multiple Sclerosis, has its headquarters at the Academy of Medicine Building in New York.

The disease is believed to be more than twice as common as infantile paralysis, but no one knows the exact number of victims.

Double vision, involuntary quivering, difficulty in walking and balancing, speech difficulty, numbness of parts of the body and emotional upsets are among the symptoms which result from a patchy destruction of the nervous system. What causes the nerve destruction is not known though there are numerous theories.

The disease most often strikes young people between the ages of 20 and 40, frequently incapacitating them for life. No cure is yet known for it.

Science News Letter, October 20, 1946

Research Leads to New Link Between Cancer, Diet

➤ NEW EVIDENCE for a link between cancer and diet is reported by W. D. Salmon and D. H. Copeland of the Alabama Agricultural Experiment Station.

A diet that does not contain enough choline results, within eight to 16 months, in cancers occurring in a high percentage of laboratory rats, they find. The abnormal growths, both cancerous and precancerous, occurred principally in the lungs and liver.

In the experiment, dietary cancer in the livers of the animals was always found to follow cirrhosis of the liver. Cancer of the liver in people likewise follows cirrhosis in a high percentage of cases, the nutritionists point out in their report to the American Journal of Pathology.

Malignant tumors occurred in the livers of 30% of the rats receiving the low-choline diet. Primary cancers were found in the lungs of 38% of the animals. In 10% of the cases, malignant tumors de-

veloped under the skin or were imbedded in the muscular tissue. None of the control animals receiving the same diet as the others but with adequate amounts of choline developed cancer.

Choline is a relatively simple organic base, sometimes classed as a vitamin.

Of the many attempts to link cancer to diet, the work of the two Alabama nutritionists is believed to be the first in which cancer has been produced in experimental animals as a result of a specific dietary deficiency.

Science News Letter, October 20, 1946

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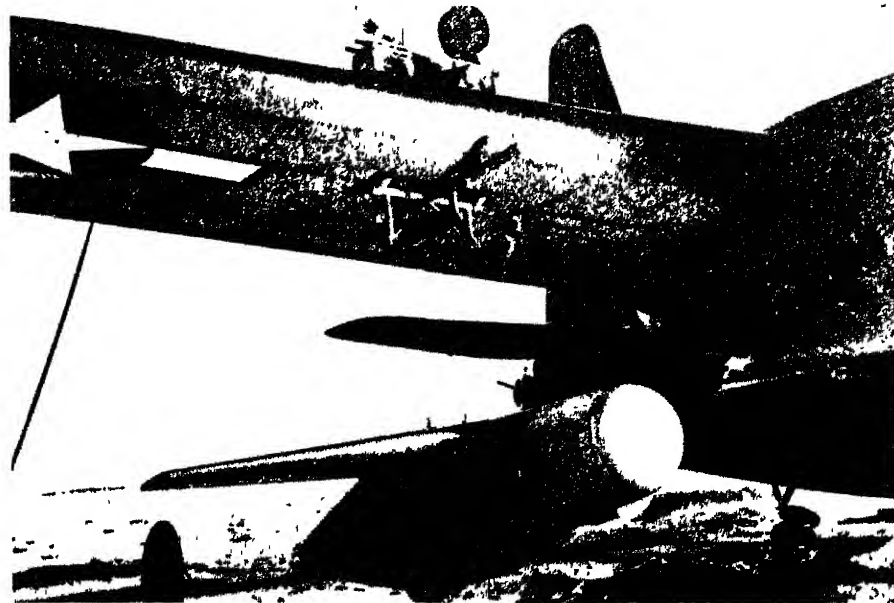
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Official U. S. Navy Photograph

ROBOT BOMB—Pulley device lifts the Bat to its launching position under the wing of a Privateer. The giant patrol carries a Bat under each wing.

RADAR

"Bat" is Guided Bomb

Its own radar guides it to its target; planes carry one or two bats, releasing one or both at the same time.

➤ A RADAR-GUIDED "suicide" bomb, that glides like an airplane and blows itself up when it almost unerringly finds its target, got its first public showing in Chincoteague, Va.

The bat, latest Naval guided missile, is no longer an experiment. It is ready for active combat use. It is now standard equipment. Navy officials are confident that it will give a good account of itself, if another war is fought.

Like the little flying animal after which it is named, the bat emits invisible waves and uses them in navigation. But the Navy's bat uses the high-frequency radio waves of radar instead of the high-pitched sound waves of the animal bat.

With a ten-foot wingspread and a body length of about 12 feet, the bat looks like a small airplane without engine or propeller. Radar equipment in its nose keeps the missile, after its release from its mother-plane, headed directly on the target, which may be an enemy ship or a land installation.

Its target can be attacked day or night, in clear or foggy weather. The bat's radar equipment is focussed on the target

before its release. An operator on the mother-plane spots the enemy by radar if necessary.

The mother-plane carries the bat under its belly or under its wings. The release is made from four to eight miles away, and preferably from an altitude of from several thousand to 12,000 feet. The bat sweeps downward and forward, when freed, in a long glide to approach its prey at a low angle. Once the bat is launched, the mother-plane flies off to safety.

The radar device is somewhat like the kind used with anti-aircraft guns to keep them accurately aimed on moving aircraft. It sends out radar pulsations which originate in the bat's own battery. Reflected pulses are received on its own receiving antenna. If the target is out of the radar field center, delicate mechanisms elevate or lower the bat, or turn it to right or left, until it is in exact attacking position.

In experiments, the bat hit its target some 50% of the trials made. When it hits, its bombload explodes. It is a "suicide" craft, except that no human

lives are involved as the craft is not manned.

If a big and powerful vessel is the target, two bats are released from a single plane at the same time, and they will hit at almost the same instant. The double blow would be effective upon most ships.

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ORNITHOLOGY

Owls Love Darkness, Though Their Deeds Are Not Evil

See Front Cover

➤ OWLS, bats and black tomcats are always dominating motifs in Halloween party decorations, presumably because these nocturnal creatures were supposed to be the familiars of warlocks and witches, hobgoblins and demons who traditionally held carnival on the eve of the Feast of All Saints.

For owls at least a disclaimer can fairly be entered. True, they love the darkness, but not because their deeds are evil. Owls, like their day-flying kindred, the hawks, are honest, hardworking birds whose principal business is catching mice and other destructive small rodents. Anyone who kills an owl is doing himself a spite, just as much as if he kills a hawk.

The short-eared owl, shown on the front cover of this SCIENCE NEWS LETTER, sometimes violates the working rules of its own union by doing a little daylight hunting when the overcast is heavy and the daylight dim. Unlike most other owls also, it is a bird of open spaces, often being called marsh owl or prairie owl. This particular specimen was taken about 70 miles south of Chicago, and was photographed by Rev. Joseph W. Baechle, C.P.P.S., of St. Joseph's College, Collegeville, Ind.

Science News Letter, October 26, 1946

INVENTION

Receiving Set Combines Hearing Aid Radio

➤ TWO DAYTON, Ohio, inventors, T. B. Fordham and T. W. Moore, have taken advantage of the fact that the vacuum-tube hookup and battery equipment in a hearing aid are quite similar to those in a portable radio receiving set to combine both functions in one instrument, on which they have received patent 2,409,481. The user can summon any entertainment or news that may happen to be on the air.

Science News Letter, October 26, 1946

MEDICINE

Anesthetics Relieve Minds

The centenary of the demonstration of ether as an anesthetic witnesses many dramatic uses of anesthetics other than for relief of physical pain.

➤ THE NEW-FOUND power of anesthetics to relieve mental anguish promises to become almost as valuable as their power to relieve physical pain, Dr. Henry K. Beecher of Harvard declared at the Massachusetts General Hospital's celebration of the one hundredth anniversary of the first public demonstration of ether anesthesia.

Wounded men during the war were sometimes saved from death by doses of an anesthetic drug too small to relieve pain but big enough to put them to sleep. One such patient described by Dr. Beecher was mad with pain. He writhed and tossed so that no one could properly examine or treat his wound. Morphine in dangerously large doses often failed to help in such cases. Only when the man had been put to sleep with a sleeping tablet, not a pain-killer, could the surgeons operate and close the wound.

Equally dramatic are the effects on mentally sick patients of this relatively

new use of anesthesia. With its aid, physicians can probe the mind painlessly, just as the surgeon can painlessly probe the flesh for shell fragments in the anesthetized patient. The workings of the mind can be studied; it can be relieved and often freed of sick thoughts and feelings.

The quality of anesthetics that makes it possible to use them for this purpose of relieving mental pain and removing sore spots was discovered almost 50 years before the ether demonstration, whose hundredth anniversary was celebrated in Boston. Sir Humphrey Davy in the year 1799 while experimenting with nitrous oxide, the gas used by dentists for tooth extraction in modern times, realized that this anesthetic made it possible for him to get at levels of his mind not ordinarily accessible. Great strides have been made since then, but Dr. Beecher declared that "The potentialities for future discoveries in this field seem barely to have been tapped."

Ether Beginnings

➤ A NEWSPAPER reporter of a century ago, Albert Tenney, of Boston, was credited for helping bring to millions the boon of ether's relief from pain during surgical operations. His part in bringing about the first public demonstration of ether anesthesia just 100 years ago was reported by Dr. Reginald Fitz of Harvard Medical School.

Mr. Tenney had become a friend of Dr. William T. G. Morton, when the latter was a struggling young dentist with "a flair for publicity." As a result of this friendship, Mr. Tenney was present when Dr. Morton painlessly extracted an ulcerated tooth from a patient under ether in his office. Mr. Tenney's report in the Boston Evening Journal of this then astonishing feat was read by Dr. Henry J. Bigelow, a young physician whose father was president of the Massachusetts Medical Society.

Dr. Henry Bigelow's interest was so aroused by this newspaper account that he looked into the matter and, after watching Dr. Morton use ether in his office for extracting teeth painlessly, encouraged him to call on Dr. John C. Warren, professor of surgery at Harvard. The demonstration of ether anesthesia being celebrated followed.



PORTRAIT PRESENTATION—Dr. Henry A. Murray (left) presented a portrait of Dr. William T. G. Morton, to Massachusetts General Hospital at its Ether Day celebration. Dr. Arthur W. Allen (center) and Dr. Nathaniel W. Faxon accepted the portrait on behalf of the hospital.

Breast Cancer Not Simple

➤ IS THERE a simple way to prevent breast cancer in humans as there is in mice? Within the next 10 years scientists should have the answer.

It may be a big and disappointing NO. Women are warned against hoping too much and urged to wait for the answer before applying the method.

In mice, the method is never to let baby mice nurse from their own mothers if the mothers come from a cancer-bearing strain.

Discoveries leading to this were reported by Dr. John J. Bittner of the University of Minnesota Medical School at Ether Centenary. Some of the discoveries were Dr. Bittner's, while others were made by other scientists. In brief, the facts are these:

Mice get breast cancer from the action and interaction of three causes. These are a substance in breast milk, inherited susceptibility and hormonal, or gland, stimulation. Each is of nearly equal importance, so it is possible to control the in-

cidence of cancer by regulating any one of the causes. The most effective method, since it does not interfere with continuation of the stock, is to eliminate the milk substance by foster nursing.

These facts apply to mice. Surveys

are now under way to find whether the same simple method will control cancer in women. The surveys are being made by the University of Minnesota and Ohio State University.

Science News Letter, October 26, 1946

GEOGRAPHY

Magnetic Poles Move

➤ GET OUT that old geography book and spot the magnetic north pole. The conventional location has been in Boothia peninsula north of Hudson Bay. Now it is in McClintock Sound.

Records of the world's leading magnetic investigators at the Carnegie Institution of Washington show that there has been actual movement during the past 40 years.

Here's the history of the imaginary spot to which the magnetic needle points:

Back in 1831, Capt. James C. Ross located the pole on Boothia peninsula in far northern Canada. Maps have had it there since. When the explorer Amundsen was in the region in 1904, he found the old location to be correct.

But after 1904, the pole began to migrate. Now it's more than 200 miles

from where your school geography placed it.

Unpublished charts completed by the Carnegie Institution of Washington explain why compass needles on the "Pacusan Dreamboat's" flight from Honolulu to Cairo still pointed north as the big plane flew north of the proverbial location of the pole. The plane was still south of where the north magnetic pole of the earth is now. An earlier flight of the RAF Lancaster "Aries" in May, 1945, also showed that the pole had moved.

The south magnetic pole, too, has moved north and west about 200 miles in King George V Land in the Antarctic. But less attention has been paid it because navigators use the north-seeking point of the compass needle.

Science News Letter, October 26, 1946

MEDICINE

Hang-Overs Can Aid Cure

➤ HANG-OVERS are "significant events" in the life of an alcoholic. Proper handling of him at this critical period may sober him up permanently or at least add to his chances of eventually recovering from his Lost Week-End state.

This new and scientific approach to what most persons consider a nuisance or a subject for humorous remarks is taken by Dr. Giorgio Lolli of Yale University, director of the Yale Plan Clinic.

During the hang-over, both the psychological difficulties the alcoholic has been trying to escape through alcohol and the physical symptoms resulting from the alcoholism are magnified. In the early part of the hang-over the lingering presence of alcohol in his body depresses his central nervous system which includes the brain. Consequently he has less resistance and can more readily talk about the things in his life which drove him to drink. This gives the psychiatrist a chance to help him.

Medicines to relieve his misery and let him sleep are important first steps in the treatment Dr. Lolli outlines. The fact that he is being treated as a sick person and not a sinner helps the alcoholic. He gets more help when he finds that his mental and physical pain can be relieved by means other than alcohol.

Dr. Lolli does not approve of the "tapering-off" method of helping the alcoholic through his hang-over. In many cases the patient can be treated at the clinic or office, but some whose emotional and mental difficulties are serious and long-standing need to be put in an institution. The doctor should see the patient often, possibly every day, during recovery from the hang-over. This satisfies the alcoholic's overwhelming need for someone to depend on and makes it easier for him to keep away from liquor.

Details of Dr. Lolli's studies and method of treatment are reported in the *Quarterly Journal of Studies on Alcohol* (Sept.).

Science News Letter, October 26, 1946

MEDICINE

Bacteriophage Removes Infection from Wounds

➤ A NEW-METHOD of treating wounds with germ-eating bacteriophage was announced by Dr. V. Kolesov, Leningrad surgeon, at the meeting in Moscow of the All Union Congress of Surgeons.

The method consists in flooding the wound with the bacteriophage preparation. If the infection was localized in the surface layers of the wound, it could be removed by this method. Frequently used in Soviet military hospitals during the war, the method had beneficial effects in over 1,000 patients suffering from various surgical complaints, Dr. Kolesov reported.

Soviet doctors successfully used bacteriophages in dressing wounds to prevent severe complications. Localized applications to infected wounds of soft tissues gave positive results in 82.9% of such cases. The most effective preparation, Dr. Kolesov reported, proved to be the bacteriophage manufactured in the Metchnikov Bacteriological Institute in Moscow.

Science News Letter, October 26, 1946

CHEMISTRY

Natural Gas Product May Aid in Can Plating

➤ NATURAL GAS may be the means of freeing the United States from its present galling dependence on foreign sources for tin. Biggest use of tin, of course, is for coating sheet steel used in cans. A du Pont chemist, Milton J. Roedel, has invented a process for coating sheet metal with a solid polymer of ethylene, one of the constituents of natural gas, which is claimed to give at least as good protection as the conventional coating of tin.

The gaseous ethylene is turned into a solid suitable for coating purposes by subjecting it to very high pressures and moderately high temperatures. Dissolved in xylene and applied to black sheet steel in a layer one thousandth of an inch in thickness, then baked on, the polymer coating is flexible enough to withstand the bendings and crimpings encountered in can manufacture, and has high resistance to both acids and abrasion.

Rights in Mr. Roedel's patent, No. 2,406,039, are assigned to E. I. du Pont de Nemours and Company.

Science News Letter, October 26, 1946

ENGINEERING

Air Bubbles Improve Quality of Concrete

➤ NOW AIR BUBBLES are trapped in concrete to improve its quality, Charles E. Wuerpel, of the Army Waterways Experiment Station, Vicksburg, Miss., told the American Society of Civil Engineers.

Air bubbles in concrete are purposely created by the addition of pine resins, animal or vegetable fats and oils, and other saponifiable matter to the cement or at the concrete mixer. The process is known as air-entrainment.

"Widely dispersed spheroids of air in concrete," he continued, "will increase the resistance of the hardened mass to frost action and to chemical action by salts used for de-icing pavements far beyond that achieved with non-entraining concrete."

Pavement concrete for highways has been treated in this way, and facts gathered now show concrete used in buildings and other structures can benefit from the process.

These purposefully-created bubbles are explained as an additional aggregate, like sand, stone, gravel or slag, but they possess flexibility of shape. He stressed their advantage over rigid angular and sub-angular grains of sand or cement that can not accommodate themselves to the movement of other grains. The improvement in uniformity of bond completely offsets the possible slight reduction in bond strength, he argued.

Science News Letter, October 26, 1946

WILDLIFE

DDT Kills Mosquitoes Without Harming Fish

➤ DDT IN MIST-FINE sprays loosed from airplanes over the man-made lakes in the Tennessee valley was effective in killing the mosquitoes it was aimed at, but did no material harm to the fish in the lakes or to the small, water-inhabiting animal forms on which the fish feed.

This was discovered in tests by Dr. A. D. Hess and G. C. Keener, Jr., TVA biologists, during the season just closed.

In over-all effect, the malaria-bearing anopheline mosquitoes were almost completely wiped out, and the culicine mosquitoes, that merely annoy by biting, were significantly reduced in numbers. Some other insects, notably surface-skimming bugs and beetles, were seriously affected. Some of the surface-feeders, especially the waterstriders, are carnivor-

ous, competing with fish for food, so that their elimination may be a gain rather than a loss.

Principal animal food of fishes consists not of insects but of small crustacea—tiny, wiggling relatives of crayfishes. On these the DDT had very little effect.

The two biologists caution that their conclusions are based only on the dosage and application method used. Harm might result, they state, from heavier dosage and different application methods.

Detailed results of their investigations will be published in the *Journal of Wildlife Management*.

Science News Letter, October 26, 1946

ENGINEERING

Lightweight Truck Bodies Will Be Available Soon

➤ TIRES THAT ROLL 100,000 miles, and lightweight bodies for commercial vehicles that contribute to speed and economy, will be available when the automotive industry gets into high-speed gear again. The tires are now being produced, and lightweight truck bodies have passed the experimental stage.

The 100,000-mile tire already is available, Ben Sorci of Chicago told the Society of Automotive Engineers in Chicago. To get this wear, proper maintenance is essential, of course. Under present methods of operation the average truck owner gets no more than 50% of the mileage actually built into tires.

Approximately 25% more mileage for tires on motor trucks with aluminum bodies, as compared with conventional heavy bodies, can be expected, J. H. Dunn, of the Aluminum Company of America, declared at the same meeting. Also, 10% less fuel is required for such trucks and there is a 10% step-up in acceleration. Magnesium is eminently suitable for truck bodies, he said. In addition to tire and fuel saving, lightweight bodies built either of aluminum or magnesium provide economy by their resistance to corrosion.

Records were presented by F. O. Lewis, of Dayton Power and Light Co., which show that large increases in miles-per-gallon of fuel, and large decreases in operating costs resulted with aluminum-body trucks. The saving in license fees alone, he said, more than offsets the higher cost of aluminum over steel, or wood-and-steel bodies.

Science News Letter, October 26, 1946

AGRICULTURE

Dehydrated Potatoes May Substitute for Corn

➤ DEHYDRATED POTATOES that didn't make much of a hit with many GI's during the war may be used as a substitute for corn—in feeding sheep.

The moisture-removed spuds being fed sheep in tests at the North Dakota Agricultural College Experiment Station are low-grade potatoes that the industry has trouble disposing of profitably. Results of the experimental feeding last spring indicates that potatoes are 73% as effective as a corn diet, but with additional protein and minerals, the dehydrated product can be used as a substitute for corn.

Science News Letter, October 26, 1946

MEDICINE

Allergy May Prevent Wounds from Healing

➤ ALLERGY is now a suspect in surgical and other wounds that heal too slowly.

This is indicated in a case report by Dr. Albert H. Rowe, University of California physician, in the *Western Journal of Surgery, Obstetrics and Gynecology* (Oct. 19).

In the case reported by Dr. Rowe, the first of its kind in medical literature, the patient's wound healed within three weeks after his allergy symptoms had been treated successfully.

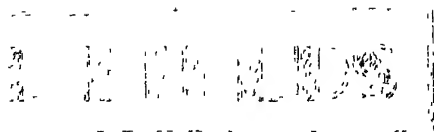
The wound had remained unhealed for two-and-a-half years after an appendicitis operation. A glistening, thin, reddish membrane had formed over the wound two months after operation, and it exuded a bloody discharge every two or three weeks.

Dr. Rowe found that the patient had suffered from life-long cramping abdominal pains and indigestion, signs of gastro-intestinal allergy.

Treatment consisted of a fruit- and cereal-free elimination diet, which relieved the allergy symptoms. The wound has remained healed for over two years.

Dr. Rowe suggests that chronic allergy should always be given consideration in wounds that fail to heal properly.

Science News Letter, October 26, 1946



MEDICINE

Distribution Process Separates Penicillins

➤ **PENICILLINS** are not merely four, as at present recognized and labeled, but "innumerable," Dr. Lyman C. Craig of the Rockefeller Institute for Medical Research told members of the American Chemical Society in New York.

Separation of these hundreds or thousands of still-unknown types of penicillin, and study of their potencies, will not depend on the time-consuming determinations of their individual boiling-points or melting-points hitherto in use, but on a new method, which the speaker called "counter-current distribution."

This system is partly physical, partly mathematical, the speaker explained. The procedure involves a system of multiple transfers of the substance under study through a series of separatory funnels so that the mathematics of the binomial theorem may be applied directly to the interpretation of the results.

Science News Letter, October 26, 1946

MEDICINE

Xenon May Become Useful as Anesthetic

➤ **ONE OF** the rarest of gases, xenon, which forms about one 170-millionth of the atmosphere, has possibilities as a new, non-explosive anesthetic, it is indicated by recently released University of California wartime research.

In "tracer" experiments with radioactive xenon, a group of researchers in the Aero-Medical Unit found that the inert gas has narcotic effects on human subjects as well as mice.

In addition to finding obvious physical anesthetic effects, the researchers took radio-autographs of mice fed radioactive xenon, and found that the gas had permeated the spinal cord and whole nervous system in the characteristic manner of anesthetics.

With the radio-autograph technique, the mouse literally takes his own picture after being sacrificed. Selected slices of tissue are placed on a photographic plate, and the radioactivity produces a picture similar to an X-ray, showing the distribution of the substance.

The anesthetic quality of xenon was discovered when the group of scientists were studying high-altitude sickness. In studying the effect of rare gases on human subjects, they received complaints of dizziness and numbness by subjects breathing a mixture of krypton and oxygen at atmospheric pressures.

This set the scientists on the following chain of reasoning: first, nitrogen, closely related to krypton and xenon in the inert gas family causes dizziness and numbness at high altitude, the reason being that it dissolves rapidly in the body in a rarefied atmosphere but not at sea level; second, xenon is much more soluble in the body than either krypton or nitrogen; third, therefore xenon might be anesthetic at sea level.

The reasoning proved to be correct, a mixture of 70% xenon and 30% oxygen producing in mice temporary staggering, stupor and paralysis.

Because xenon is extremely rare and no economical method is known of separating it from the air, detailed experiments could not be conducted on human subjects. This factor may also make it more difficult to develop the gas as a practical anesthetic.

The scientists said that while the effect of xenon alone is not enough to produce prolonged anesthesia, it may be possible to obtain such an effect by mixing it with another substance.

Dr. John H. Lawrence, assistant professor of medicine, performed the experiments with the assistance of Drs. H. B. Jones, C. A. Tobias, and J. G. Hamilton.

Science News Letter, October 26, 1946

ENGINEERING

Method of Testing Soil Strength Uses Piston

➤ **A METHOD** of testing the bearing-strength of the soil on a site proposed for an airfield was described by W. J. Turnbull of the Vicksburg station to the American Society of Civil Engineers. This California bearing ratio method, questioned by some engineers, is adopted by the Army Corps of Engineers "for reasons which were considered sound."

A three-square-inch circular piston is forced into the soil and the resistance to penetration is measured. This resistance is converted to a bearing ratio by comparing it to the resistance of a high-bearing material adopted as a standard.

Science News Letter, October 26, 1946

CHEMISTRY

Better Liquid Scrub Soaps To Reach Public Soon

➤ **MORE AND BETTER** liquid scrub soaps, despite the acute shortage of fats and oils, will soon reach the public, thanks to a new formula being widely adopted by soap manufacturers.

Ever since the government clamped down on putting edible fats and oils into the soap kettle, soap makers have been searching for more and more extenders and fillers to pad out their production. The new formula not only doubles the yield of liquid soap without increasing fat consumption, but it makes a better soap for cleansing and rinsing in hard water.

The essential chemical compound in the new liquid soap formula, as developed by the Rohm and Haas Co. of Philadelphia, is a synthetic wetting agent, alkylated aryl poly-ether sulfate. Given the trade name Triton X-300, the chemical is closely related to other synthetic organic compounds used in cosmetics, car washers, and soapless household cleaners.

Science News Letter, October 26, 1946

PSYCHOLOGY

Girls Start Outtalking Boys Early in Life

➤ **BABY GIRLS** utter more speech sounds than do baby boys. Boys and girls begin with the same number of phonetic sounds during the first year of life, but girls outtalk boys during and after the second year.

This discovery was made by Orvis C. Irwin and Han Piao Chen, of Iowa State University, from a study of 95 infants ranging in age from one to 30 months.

The scientists visited most of the babies in their homes twice each month during the first two and a half years of life. At each visit they recorded all sounds uttered by the infant on 30 breaths.

During the first two-month period of life the average baby masters 7.5 different kinds of sounds, the scientists report in the *Journal of Experimental Psychology*, (Oct.). Greater progress is made during the first year of life, they found, but its vocabulary at two and a half years includes 27 of the 35 sounds present in adult speech.

Science News Letter, October 26, 1946

ASTRONOMY

Orion Forecasts Winter

Warrior will shine in east on November evenings after a summer vacation from visibility. A partial eclipse of the sun may be seen on Nov. 23.

By JAMES STOKLEY

► FOR THE FIRST time since last April, the constellation of Orion, the warrior, appears on the maps accompanying these articles—a certain forecast, if it were needed, of the approach of winter. This figure appears to the southeast, just above the horizon, the three stars that mark Orion's belt standing vertically. To the left is Betelgeuse, in his shoulder, and to the right Rigel, in one leg, so that Orion is on his back in a rather unwarriorlike position.

The brightest star on the maps (which are drawn for 10:00 p.m. about Nov. 1 and 9:00 p.m. in the middle of the month) is Vega, in Lyra, the lyre, in the northwest. Above this group is the northern cross, part of Cygnus, the swan, with first magnitude Deneb at the head of the cross. To the left is Aquila, the eagle, with Altair.

But it is to the east that our finest display of bright stars appears. There, in addition to the two mentioned in Orion we have, above, Aldebaran in Taurus, the bull, and Capella in Auriga, the charioteer. And if you happen to stay up late some November night and see a still brighter star below Orion, that will be Sirius, the dog star, which does not now rise in time to be placed on the maps.

November this year is not a good month for planets, as only Saturn becomes visible at any time during the night. It is in Cancer, the crab, which is next door to Gemini, and below the horizon until about midnight. By then, Saturn will be visible, and will remain in view the rest of the night.

For the first time this year an eclipse of the sun will be visible in the United States and Canada in November, but it will not attract the interest of astronomers, as did that of July 9, 1945. That was total over a path crossing the northwestern parts of the United States. Over a larger area it was seen as partial. The one that occurs on Saturday, Nov. 23, will not be seen as total any place on the earth.

The shadow of the moon in space has two parts. The core, which tapers from

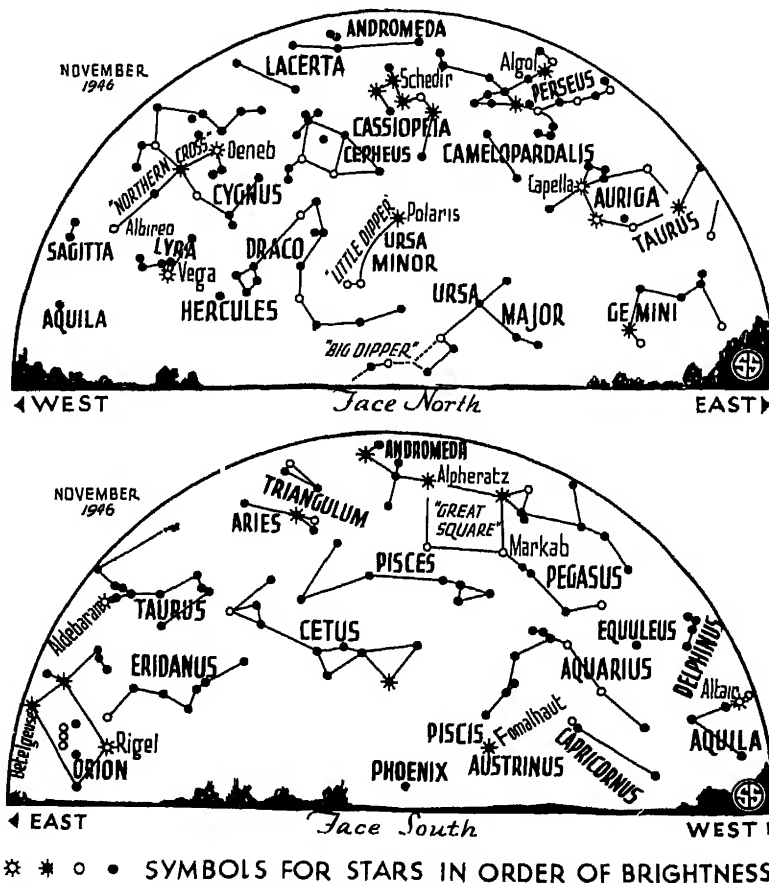
the moon to a point at a distance about equal to that of the earth, is called the "umbra" and from within it the moon completely hides the sun. But there is a larger, outer part of the shadow, the "penumbra," in which one sees the dark lunar disk only partially covering the solar face. When the umbra touches earth, as it did in July, 1945, it traces out a path where a total eclipse occurs and at the same time the larger area covered by the penumbra includes that where the eclipse is partial. In this penumbral area the eclipse is more nearly total the nearer one is to the umbra. Thus, whenever there is a total eclipse, there is a partial eclipse over a far greater area.

However, the converse to this proposition is not true. It may happen that the umbra fails to touch the earth at all,

but the penumbra does. Then we have an eclipse which is only partial, and that is what happens on Nov. 23. The umbra then passes well above the Arctic regions, but the penumbra covers all of Canada, except the extreme northwest, and all of the United States with the exception of the southwest. The greatest eclipse will occur in the region of Labrador, where more than three-fourths of the sun's diameter will be hidden. As we get away from this area, the magnitude of the eclipse will be less and less, as indicated by the following table for a few typical cities. This also shows the times at which the eclipse will be greatest in these places.

| | Percent | |
|-------------------|---------|--------------|
| Boston | 60 | 12:30 pm EST |
| Washington, D. C. | 51 | 12:22 pm EST |
| Atlanta | 36 | 12:13 pm EST |
| Chicago | 44 | 10:59 am CST |
| New Orleans | 22 | 11:06 am CST |
| Denver | 18 | 9:33 am MST |
| Portland, Ore. | 08 | 8:14 am PST |

In observing the eclipse, be careful not



to look directly at the sun. A dense photographic negative is a good protection to hold in front of the eye when watching it, or else one may look through a pin-hole in a card. Then, a while before the times mentioned above, the dark edge of the moon will begin to encroach on the upper part of the sun, and gradually get larger and larger until the maximum eclipse. After that the moon will go off from the sun's lower limb.

If you want to try a photographic record of this eclipse, you may do so by setting up your camera on a tripod or some steady support and pointing it to the southeast, the part of the sky through which the sun will move. Since the sun is so bright, you should use the smallest stop and an exposure of perhaps a fiftieth of a second. Make one exposure as it starts, then one every five minutes during its progress; without, of course, moving

the camera. The result will be a series of images of the sun, in various stages of occultation.

Celestial Time Table for November

| Nov | EST | |
|---|------------|---|
| 1 | 11 40 p.m. | Moon in first quarter |
| 4 | 2 19 a.m. | Algol (variable star in Perseus) at minimum |
| 6 | 11 07 p.m. | Algol at minimum |
| 9 | 2 10 a.m. | Full moon |
| | 7 56 p.m. | Algol at minimum |
| 10 | 8 00 a.m. | Moon nearest, 223,300 miles |
| 14 | 3 08 p.m. | Moon passes Saturn |
| 15 | early a.m. | Meteors of Leonid shower visible |
| | 5 35 p.m. | Moon in last quarter |
| 17 | 2 00 p.m. | Venus passes sun |
| 23 | 12 24 p.m. | New moon, partial eclipse of sun |
| 25 | 5 00 p.m. | Moon farthest, 252,500 miles |
| 27 | 12 50 a.m. | Algol at minimum |
| 29 | 9 39 p.m. | Algol at minimum |
| Subtract one hour for CST, two hours for MST, and three for PST | | |

Science News Letter, October 26, 1946

MEDICINE

Vaccine May Stop Mumps

Inoculation may make adults immune to mumps, although length of immunity is not yet known. Vaccine is successful on monkeys.

► The first mumps vaccine in history is in the final stages of development in the laboratory of Dr. Karl Habel, research scientist at the National Institute of Health. It has already proved successful in immunizing monkeys to mumps.

Dr. Habel's work began in 1940, when Army, Navy and public health authorities met to map the strategy against epidemic diseases in the expected war. Major emphasis was placed on combating mumps, which in World War I ranked among the top infectious illnesses in disabling men.

In addition to being a nuisance disease and a time loser, mumps in men can have serious consequences since it may cause sterility in the adult males it afflicts. According to Dr. Habel, about 50% of the population have had a childhood attack of mumps which gives immunity, and some persons may have acquired immunity without having an attack.

Dr. Habel was able to test his vaccine on a huge scale last summer when he inoculated over a thousand West Indians in Florida. They came to this country under the auspices of the War Food Administration to work in the sugar fields. Since mumps is a rare ail-

ment in their islands, the men were particularly susceptible. Last year mumps struck 600 out of 3,000 Jamaicans in the same area.

Although the results are not yet in, the vaccine now looks promising.

Dr. Habel, who manufactures his own vaccine, incubates the virus in monkeys and chick embryos. After the virus has been developed to desired potency, it is whirled through a centrifuge to concentrate the virus particles. It is then made sterile by ether, formaldehyde or ultraviolet rays. The resulting vaccine stimulates the body to develop antibodies

"It is encouraging to note," Dr. Habel

says, "that the number of antibodies so developed is the same as those resulting from a regular attack."

It is not yet known, however, whether the immunity produced by the vaccine will be life-long like that after a natural siege of the disease

Dr. Habel points out that it is probably not a good idea to use the vaccine on children. Since the vaccine may not give life-time immunity, a boy may grow up without having had mumps and so expose himself to serious possibilities when a man Mumps in children generally is a mild illness.

But the mumps vaccine should be useful for adult travelers from countries where mumps is relatively unknown to places like the United States where it is prevalent. It will be valuable for parents who have not had mumps to protect themselves from their youngsters. Persons having to live together intimately, as in the barracks-like dormitories of today's colleges, will also be benefited.

Science News Letter, October 26, 1946

CHEMISTRY

Sulfur-treated Petroleum Makes Soap Substitute

► NEW HOPE for soap-seeking housewives was voiced by a chemist who said that an efficient soap substitute has been made from petroleum treated with sulfur.

Dr. Chester M. Suter, associate director of the Sterling-Winthrop Research Institute, Rensselaer, N. Y., described a new method of sulfonating petroleum which was used in Germany during the war to produce a substitute for soap and other types of cleansing agents. He added that American research on this process now produces useful products.

Mersol, one of the German soap substitutes, had excellent wetting quality, very good foam formation and great stability in hard water plus high washing power, Dr. Suter reported.

Science News Letter, October 26, 1946

ANYONE CAN USE A SLIDE RULE

Absolutely no math background needed if you have the **PRACTICAL SLIDE RULE MANUAL** by J. M. Klock, Mathematician for the U. S. Navy and former instructor in the Detroit Public Evening Schools. An absolutely non-technical explanation of how to use a slide rule for the fundamental math calculations. **STUDENTS** of all math, science, and technical subjects will find the use of a slide rule to be a great aid in their work. **SHOP AND TECHNICIANS:** special applications made to formulae from mathematics, engineering, aeronautics, air navigation, etc. The slide rule gives rapid solutions to all the basic formulae. **OFFICE:** and business administration applications are numerous. The slide rule is especially valuable in per cent and interest work, and cost accounting. The booklet includes chapters on these subjects. The slide rule is also a valuable rapid estimator.

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Do You Know?

Americans eat ten times as much *shrimp* as lobster.

Fall is the best time to turn over soil in the home garden.

Soot from wood contains carbon and some ammonia and, therefore, has value as a fertilizer.

Ammoniated mercury, in a cream, has been successfully used to make Negroes' skins several shades lighter.

The average gross value of *crops* grown in 1945 on lands under government-built irrigation projects was over \$100 an acre.

Highway *post offices* have been added to the U. S. postal system; they are motor vehicles, within which mail is sorted en route, that pick up and deliver sacks at local stationary post offices.

Oil of wormwood, distilled largely in southern Michigan from an herb, *Artemisia absinthium*, is a component of a flavoring agent used in alcoholic beverages of the vermouth type and in cordials.

The *wild duck* population of the United States has declined from approximately 125,000,000 in 1944 to some 80,000,000 this year due to drought conditions in the north central states and Canada, and overshooting in 1945.

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By Oscar L. Levin, M.D.
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NUCLEAR PHYSICS

Neptunium 237 Fissions

This isotope of the recently discovered element will not make an atomic bomb, and only a small quantity is available for experimentation.

➤ A THIRD CHEMICAL element can be split asunder by slow neutrons and made to release atomic power, Prof. Glenn T. Seaborg of the University of California, codiscoverer of this chemical element as well as the atom-bomb's plutonium, has announced.

But the neptunium isotope 237 is still a scientific curiosity, manufactured as a plutonium byproduct with only a hundred milligrams (a mere three hundredths of an ounce) available for scientific studies.

Diplomats worrying about international control of the atomic bomb need not be concerned about this latest fissionable element. It can't be used in making atomic bombs.

It may eventually be used in atomic power production, but it can't be produced in a large quantity, as plutonium, or even uranium 235, the other two fissionable elements.

Neptunium 237 was originally discovered in 1942 by Dr. A. C. Wahl and

Dr. Seaborg, but that it would fission was not previously announced.

Existence of a second isotope 241 of plutonium was announced, the original variety being 239, used in the Nagasaki bomb.

Three new isotopes of neptunium were announced, numbers 234, 235 and 236. Two isotopes of curium, element 96 and present highest in atomic number, were announced, 240 and 242. All these have half-lives measured in hours, days or months.

But one previously known isotope 241 of americium, element 95, also manufactured by atomic transmutation, was found to have a half-life of 500 years.

The new neptunium isotopes were produced by bombardment of uranium with 22,000,000 electron volt deuterons (hearts of heavy hydrogen) and 44,000,000 electron volt alpha particles (hearts of helium) in the 225-ton cyclotron under direction of Dr. J. G. Hamilton.

Science News Letter, October 26, 1946

EDUCATION

Board Stresses Education In Agriculture for South

➤ EDUCATIONAL correctives for the "human erosion" that gnaws the folk of the South, as water and wind gnaw at her soil, is receiving major emphasis in the program of the Rockefeller General Education Board, Raymond B. Fosdick, its president, states in the Board's annual report.

Especial stress is being placed on the more practical phases of agricultural education, particularly on the rational utilization of land resources, and on soil preservation and rebuilding. Advantages of this training are offered to Negroes as well as to whites.

Mr. Fosdick adverts to the oft-cited low expenditures for education in the South—less than half of what it is in many northern states. "It is not well known, however," he points out, that most southern states are spending a larger percentage of their income on education than is expended by many of the wealthier states of the North, West and Middle West."

Science News Letter, October 26, 1946

Lactic acid, widely used in industry, can be made cheaply by a new process from sulfate liquor, a pulp mill waste.



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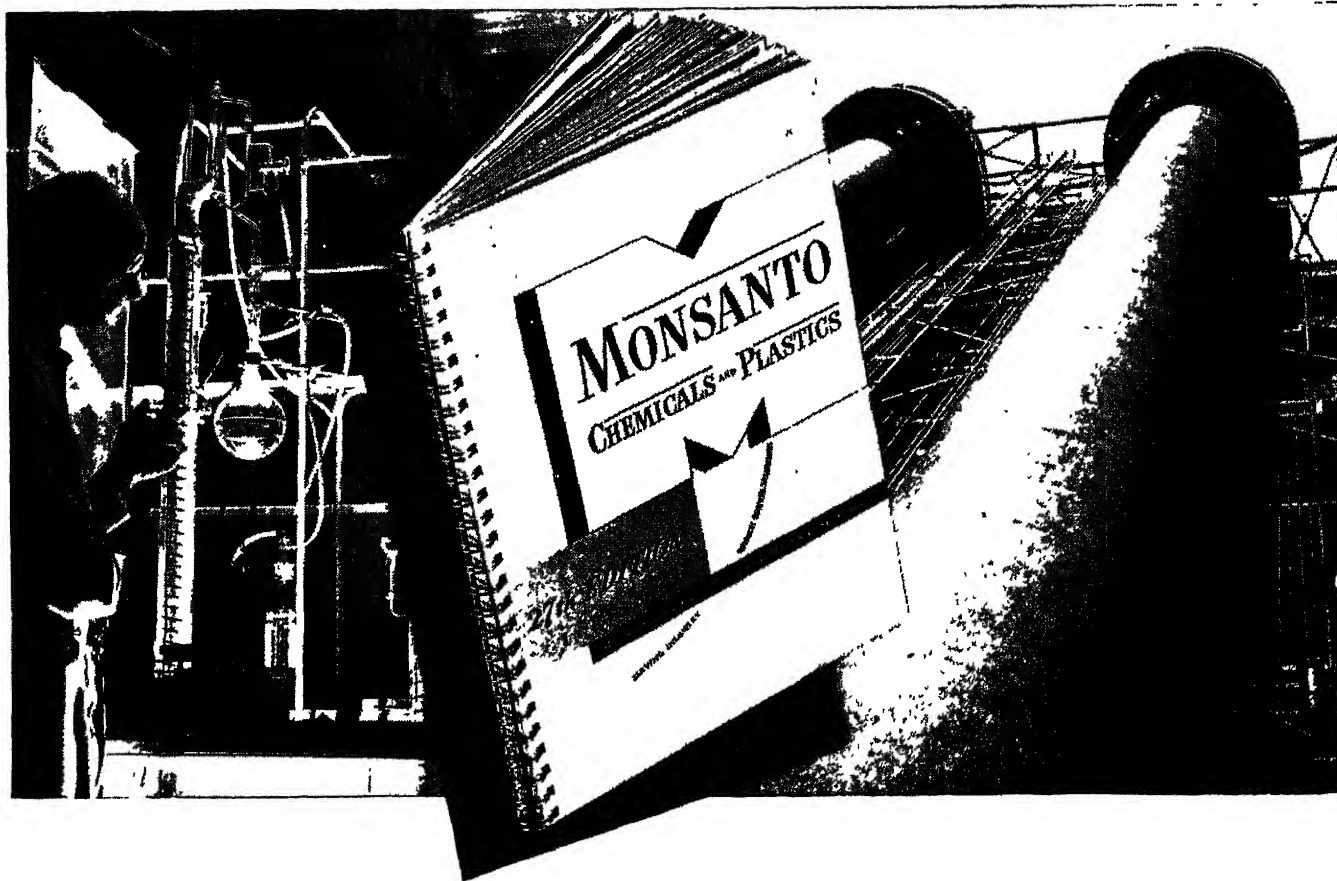
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Research facilities and activities, too, are constantly stepped up and broadened. Within the past few months, Monsanto has set aside \$2,500,000 to be de-

voted solely to exploring the peacetime possibilities of the atom as a source of constructive power. This research will be centered at Oak Ridge, Tennessee . . . Also, Monsanto has recently inaugurated a research policy which provides academic leave for outstanding Monsanto industrial scientists, who may continue their studies at universities of their choice, for a full year at full salary.

This is but a glimpse of Monsanto's preparations to meet the future of industry. It is related primarily as an invitation to consult Monsanto on any aspect of your immediate or long-range developments.

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S E R V I N G I N D U S T R Y . . . W H I C H S E R V E S M A N K I N D

ENGINEERING

Roller Bearings Protect Building from Earthquake

➤ ROLLER BEARINGS are being installed in a building in Los Angeles as a protection against damage from earthquake shocks.

The installations are under the main pillars of a three-story addition atop a six-story Sears, Roebuck building, a structure completed before the city's present building code had been adopted.

Sixty-five sets of especially designed bearings, each weighing 600 pounds, are being used. Each assembly supports a load of 250,000 pounds, and acting together the bearings permit the three-story addition to move six inches in any direction. Their use divorces the vertical loads, due to gravity, from the horizontal forces exerted by the ground waves of an earthquake.

Each anti-earthquake bearing consists of three steel plates with two sets of steel rollers placed at right angles to each other. One set of rollers permits movement in one direction; the other set, movement at a right angle. If a diagonal shock is experienced, both sets operate.

The bearings were made by the Torrington Company of South Bend, Ind.

Science News Letter, October 26, 1946

SECRETS OF INDUSTRY

BY LEWIS C. ORD

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Beauty Betrayed

➤ FRINGED GENTIANs, through most of their former range in the north-eastern states, have become so rare that enthusiastic flower lovers and keen students of botany may go for years without seeing even one of their beautiful blue blossoms. And it is all a result of over-enthusiasm by flower-lovers of a former generation—our grandfathers and grandmothers, who saw no reason for letting a flower stand on its stem if they happened to fancy it and wanted to carry it home and put it in a vase. That's what happened to millions of fringed gentians back in the nineteenth century—they died in parlor vases.

It is a bitter shame that this had to happen, for of all the blue-and-gold beauty that is autumn, no one thing ever stood out with more beauty than the fringed gentian. Both in gracefulness of form and ringing clearness of color, it seems more like a spring flower than one of late autumn. The four flaring upper ends of its petals, standing out boldly from the green calyx that offers them to the sun, are something for poets to write about. Indeed, one of the best of early American poets, William Cullen Bryant, dedicated one of his finest poems to the fringed gentian.

One reason why the fringed gentian has suffered so badly at the hands of its too-possessive friends is that it depends primarily on seed for its propagation. If you pick the flower you pick next year's gentians, too, and those of many a year thereafter—unless there chance to be some hidden flowers that you have overlooked. So the best thing to do, if you chance on a few survivors, is to look your fill, but let them alone—and don't tell anyone else of your discovery.

In one part of our country, fringed gentians live and flourish in great abundance. That is in the northern Rockies; in Yellowstone National Park within easy sight of the tourist highways there are whole alpine meadows that are blue with gentians in July and August—for these flowers, like all mountain flowers, must come into bloom early to avoid the early winter. This gentian, of course, is not identical with the fringed gentian of the East. But allowing for its somewhat greater size and sturdiness, it passes fairly enough for a western sister of the flower that Bryant loved.

Science News Letter, October 26, 1946

GEOLOGY

Helium Gas Traces Oil, Gas Movements

➤ THE NON-INFLAMMABLE light helium gas that gives lift to American blimps and balloons has found a new use.

It is being employed in West Virginia as a tracer to chart underground movements of oil and gas. This is its first use for this purpose in the East, but it has been tried successfully in both California and Texas.

Helium is especially suitable for this purpose because it is an inert gas, so inactive that it has never been found in compounds. It retains its identity though mixed with other gases and oil-well fluids.

It is being injected into oil- and gas-bearing layers deep in the earth. It travels with the gas or oil, and finds its way to output wells in the vicinity.

By careful observation of the length of time for the helium to travel to the adjacent output wells, and determining the amount of helium in each producing well, engineers can determine with reasonable accuracy the reservoir conditions between the two wells.

Science News Letter, October 26, 1946

CHEMISTRY GAMES

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Books of the Week

ADVENTURING IN SCIENCE, DIRECTED ACTIVITIES II—Powers, Neuner, Bruner and Bradley—*Ginn*, 166 p, diagrs, illus, charts and maps, paper, 68 cents. A workbook to guide pupils in their study of the accompanying textbook, *Our World Changes*.

ADVENTURING IN SCIENCE, DIRECTED ACTIVITIES III—Powers, Neuner, Bruner and Bradley—*Ginn*, 166 p, diagrs, illus, charts, and maps, paper, 72 cents. A workbook to guide pupils in their study of the accompanying textbook, *Using Our World*.

ANIMAL TALES. An Anthology of Animal Literature of All Countries—Ivan T Sanderson, Ed—*Knopf*, 510 p, illus, \$5. This collection of 31 great animal stories, both fictional and true, has been gathered from all over the world. For each tale the author supplies by way of prologue a little essay on the land, its flora and fauna, and ecological significance.

THE CHALLENGE OF MARRIAGE—Rudolf Dreikurs—*Duell, Sloan & Pearce*, 271 p., \$3. In this book the author deals with the psychological and social factors which are responsible for our present-day confusion in the problems of sex, love, and marriage. The understanding of these basic factors will help the individual in his efforts to solve the common problems of marriage.

CHEMISTRY OF FAMILIAR THINGS—Samuel S. Sadtler—*Lippincott*, 310 p., illus, diagrs and tables, \$4. This book discusses fully air, water, metals, rocks, soil, food, textiles, light, heat and the chemistry of many household substances. A store of valuable information bearing upon everyday life and problems will be found in this layman's chemistry.

THE GOLDEN ENCYCLOPEDIA—Dorothy A. Bennett—*Simon and Schuster*, 125 p, illus, \$2.50. The book will answer questions on the past, present and future wonders of the world. There are sections on almost everything that children will want to know about—animals, plants, airplanes, jewels, and many other things. Throughout the book an effort has been made to show the relationship of ideas and things.

HARVEY CUSHING. A Biography—John F. Fulton—*Charles C. Thomas*, 754 p, illus

and diagrs, \$5. The story of a great medical pioneer, whose desire for perfection in every detail of his surgical ritual, his writing, and his drawings was carried over into his daily living. The result of his systematic preservation of books and papers has been an almost unparalleled wealth of biographical material. This has been condensed into a single volume which medical student and general reader alike will find interesting and challenging.

INTRODUCTION TO COLLEGE MATHEMATICS—Carroll V. Newsom—*Prentice-Hall*, 344 p, diagrs and tables, \$4.65. This book has been developed to meet the needs of those students who want some college mathematics, but who do not intend to specialize in mathematics or science.

LYMPH—Ralph Waldo Miner, Ed—*New York Academy of Sciences*, 203 p, illus, tables and graphs, paper, \$2.75. Vol XLVI, Art. 8.

NOTES ON NURSING What It Is, and What It Is Not—Florence Nightingale—*Lippincott*, 80 p, tables, \$1.25. This book is a facsimile of the original 1859 edition. Its basic discussion of bedside nursing, its common-sense evaluations, all preserve a distinguished background to nursing and will be read and made a valuable part of any nurse's armamentarium.

OPERATIVE GYNECOLOGY—Richard W. Te Linde, M.D.—*Lippincott*, 751 p., illus and diagrs, \$18. The present volume attempts to bring the subject of operative gynecology up to date and to make recent information on that subject available in a single volume. The book is written with the primary purpose of describing the technique of the unusual and some of the rarer operative procedures.

OPHTHALMOLOGY IN THE WAR YEARS—Meyer Weiner, M.D. Ed—*Year Bk. Pubs. Inc.*, 1166 p., \$13.50. A review of all obtainable articles published on ophthalmology throughout the world, beginning with January, 1940, and continuing until 1943.

PROCEEDINGS OF THE MEXICAN-AMERICAN CONFERENCE ON INDUSTRIAL RESEARCH—Sept 30-Oct 6, 1945—Sponsored by *Armour Research Foundation* of Illinois Institute of Technology, 176 p., paper, \$2.50.

SEX EDUCATION. A Guide for Parents, Teachers, and Youth Leaders—Cyril Bibby—*Emerson*, 311 p, \$2.50. This book has been written to help parents, teachers, and youth leaders to give children the kind of sex guidance that will equip them for intelligent and happy living. Besides telling how to give the facts, and what facts to give, it stresses the importance of right attitudes.

TATOOSH—Martha Hardy—*MacMillan*, 239 p, illus., \$2.75. The book is a vigorous, authentic and lively account of another way of life. It is a first-hand story of a "school ma'am" who spent three months as a "lady lookout" for the U. S. Forest Service. Her post, Tatoosh, is one of the

highest peaks in the Cascade Mountains of Washington.

WHAT GOES ON AROUND YOU—F. H. Hagner—*Position Finder Corp.*, 28 p, illus, diagrs. and chart, paper, \$2. This book, showing new illustrations, a star and time zone chart with seven measuring tapes, enables one to obtain a clear understanding of our universe.

Science News Letter, October 26, 1946

ENGINEERING

"Submarine Jeep" Travels Through Deep Puddles

➤ LATEST ACCOMPLISHMENT of the war-lamed jeep is to travel through water that comes above the engine hood, or as deep as the driver can go.

Two periscopes and the driver's head are all you see above the water as the vehicle travels through a deep puddle. The periscopes, for air intake and exhaust, are a part of a deep-water fording kit that includes parts and attachments that seal the motor.

The "submarine jeep" is the Navy's latest amphibious vehicle. The new attachments are expected to help the jeep ford streams or other small bodies of water.

Science News Letter, October 26, 1946

Two Books
For Earthbound
Boys and Girls

THE ANGRY PLANET

By John Keir Cross. Illustrated by Robin Jacques. This is a plausible fantasy about the first rocket-ship flight to Mars with two boys and a girl as accidental stowaways. Seldom does a book offer young minds such entertaining food for thought. The illustrations convey all the imaginative beauty of the text. 256 pages. Ages 12-15. \$2.00.

THIS IS THE MOON

By Marion B. Cothren. Illustrated by Kurt Wiese. In this book, which reads like a story but is scientifically accurate, the reader takes a jaunt around the earth to hear the moon myths of many peoples—Chinese, Hindus, Africans and American Indians. During the trip he learns the answers to most of his questions, such as, "Why does the moon change its shape?" 96 pages. Ages 8-12. \$2.00.



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☼ **POTATO PEELER** for the home, designed to fit on the base of an ordinary electrical mixer, removes the skins by the rubbing and scraping action of a rotary brush and stationary abrading surfaces. Placed in the sink, a stream of water washes the peelings away.

Science News Letter, October 26, 1946

☼ **CHEMICAL DEFROSTER**, to clear automobile windshields of ice, sleet or frozen rain, thaws the blinding frost when rubbed with a rag to which a few drops of the liquid has been added. The defrosting chemical leaves the windshield clean as well as clear, and is harmless to auto finishes.

Science News Letter, October 26, 1946

☼ **BOTTLE OPENER** removes caps easily and at the same time prevents squirting overflow. An aluminum bell-shaped device, that fits over the bottle top and cap, has upward extending plier handles which, when squeezed, force three claw-like fingers under the cap.

Science News Letter, October 26, 1946

☼ **FLAT IRON** replacement heating unit is so constructed that it can be easily installed in most electric irons. Heavy die-cut mica forms are wound with flat chromel or nichrome resistance wire, with thick mica insulating protectors machine-riveted to both sides of the heater coil.

Science News Letter, October 26, 1946

☼ **WALLCLOTH**, with its threads in-



side shields of transparent plastic, is particularly suitable to use instead of wall-paper on kitchens and children's rooms because it can be cleaned with ordinary household soaps and solvents. The picture shows a youngster's writing being removed with a common cleaner.

Science News Letter, October 26, 1946

☼ **LAMP SHADES** made of a fiber glass material reflect and diffuse the light through their millions of tiny facets to give a result somewhat approximating sunlight. Made in four colors, they are decorative, fire-resistant, easily cleaned

with a wet cloth, and will not warp, sag or wrinkle.

Science News Letter, October 26, 1946

☼ **AIRCRAFT WIRE**, which reduces fire hazard, is 30 per cent lighter than ordinary electrical wire and in large transports saves up to 300 pounds in weight. The wire is coated with glass fiber and a fire-resistant synthetic rubber which is little injured by oil, chemicals and fungi.

Science News Letter, October 26, 1946

☼ **WATER FILTERS**, which remove mineral salts, contain cartridges of special resins which may be replaced when they have reached demineralizing capacity. The removed cartridges can be regenerated with dilute acid and alkali solutions. The filters deliver practically pure water.

Science News Letter, October 26, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 33A. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

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Question Box

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BOTANY

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Should bats actually be considered in the class with hobgoblins and witches? p. 261.

PSYCHOLOGY

Which talks first, the baby girl or the baby boy? p. 265.

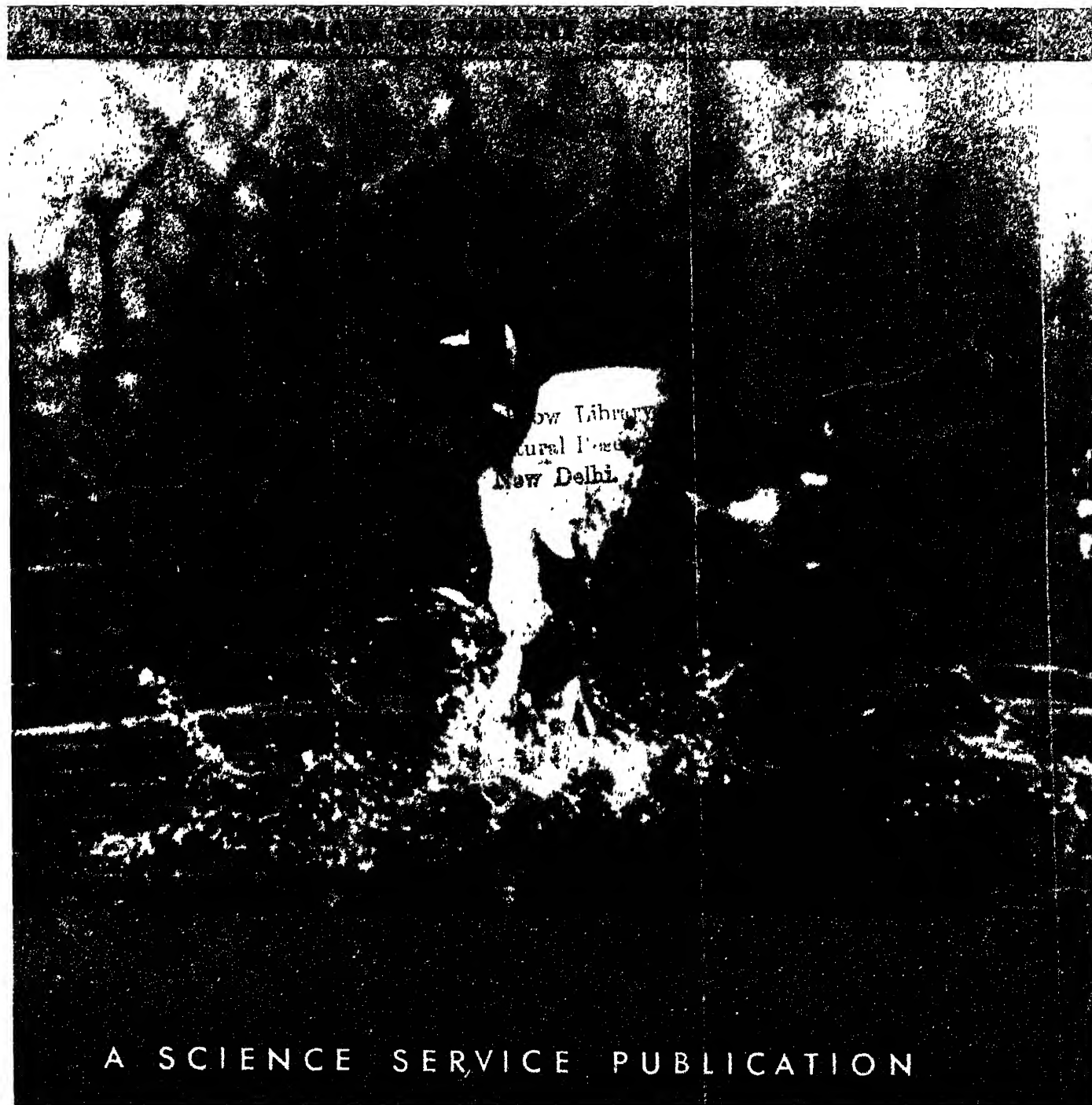
RADAR

How does the Navy's "Bat" arrive at its target? p. 261.

Where published sources are used they are cited.



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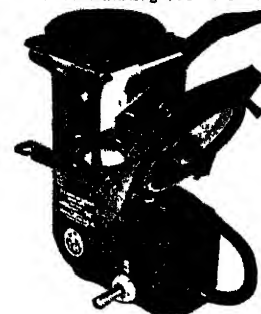
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MEDICINE

1918 'Flu Won't Repeat

Influenza viruses and humans have declared a sort of truce that won't allow more than mild epidemics unless new germ develops.

► WE SHALL NEVER have another worldwide influenza epidemic like the disastrous one of 1918, Dr. Thomas M. Rivers of the Hospital of the Rockefeller Institute for Medical Research declared at the meeting of the National Academy of Sciences.

Only if a new kind of flu germ suddenly develops from one of the two known influenza viruses and a large proportion of the world's population is susceptible to the new virus is there any likelihood in Dr. Rivers' opinion of a repetition of the 1918 influenza experience.

Something like a truce has been declared between the known influenza viruses and human beings. This is because rapid transportation of all kinds has made the world one community so far as influenza is concerned. All populations of the world are probably thoroughly "seeded" with the two viruses and people and flu viruses can live in a kind of equilibrium.

We shall probably continue to have mild and moderate flu epidemics here and there throughout the world. The flu viruses may gain the upper hand as new susceptible persons are added to the population with the birth of new babies. This may upset the equilibrium or truce between man and influenza temporarily here and there but a new truce will then be established.

Other highlights in Dr. Rivers' talk on epidemic diseases:

We do not need to worry about cholera and epidemic typhus getting started in this country because the germs would find conditions here unfavorable for their establishment and spread.

Better way than quarantine to keep diseases from spreading across international boundaries is to have a civilization and a standard of living for humans that provide poor living and travelling conditions for germs and the insects and animals that harbor and spread them.

The Island of Sardinia and some island in the South or Central Pacific might be dedicated to scientific studies of the possibilities of stopping diseases spread by mosquitoes by mosquito eradication.

In Sardinia it might be determined just how difficult it is to wipe out the anopheline mosquitoes that spread malaria from a long-established stronghold.

In a small, unimportant Pacific island, efforts could be made to see whether anopheline mosquitoes can be established in regions where they normally do not exist.

Science News Letter, November 2, 1946

NUTRITION

Man to Know Exact Protein Requirements

► EXACTLY how much protein man himself needs will soon be known, Prof. William C. Rose of the University of Illinois predicted at the meeting of the National Academy of Sciences.

For the first time, nutritionists and physicians will be able to set protein rations for men, women and children on the basis of human needs, instead of

figuring this from what rats or other laboratory animals require.

The rat's protein requirements, long used as basis for setting human diets, may not apply to man, it now appears. Man needs only eight amino acids to fill his protein requirement instead of the nine needed by laboratory animals, Prof. Rose has already discovered.

The discovery that man can get along without histidine in his daily diet was "most unexpected," Prof. Rose stated. Histidine had long been considered one of the essential amino acids, and it is essential for rats.

Meat is not the only source of amino acids, commonly called protein building blocks. It is a good source because it contains all the ones previously considered essential. When meat is scarce, the nutritionist and housewife have to find substitutes by figuring what combinations of other foods will supply all eight essential amino acids. They can do this job better when they know exactly how much of each is needed.

Patients too sick to eat or digest meat now are frequently fed amino acid solutions by vein. If the results are not always satisfactory or if more of these expensive materials are used than need be, it is because physicians have not had exact knowledge of what is required.

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RECEPTION—The Smithsonian starts another 100 years. Dr. and Mrs. Alexander Wetmore receiving in the U. S. National Museum rotunda shake hands with Prof. Maurice Caullery of the French Academie des Sciences, one of the delegates at the meetings of the National Academy of Sciences and the American Philosophical Society.

METEOROLOGY

Weather Is International

Meteorology and oceanography must be related in world-wide research. Adequate weather information must be of international scope.

► RESEARCH on an international basis is the prime need in the related sciences of meteorology and oceanography, scientists from all over the world were told at the opening session of the fall meeting of the National Academy of Sciences. You cannot intelligently discuss the weather of any one country, however small, unless you know the weather all over the world; you cannot tell the full meaning of the waves breaking on a single beach without a background of knowledge of all the oceans.

The needs of these two boundaryless sciences were presented by Dr. H. U. Sverdrup, director of the Scripps Institution of Oceanography at La Jolla, Calif., and Dr. C. G. A. Rossby, University of Chicago meteorologist.

Dr. Sverdrup gave particular point to his discussion by showing how oceanographers during the war made use of world-wide weather reports in preparing forecasts of ocean swells and beach waves needed by the high command in planning landings and other operations. Advance knowledge of the height of the waves on the beaches of Normandy or Okinawa depended on accurate reports of direction and force of the winds blowing hundreds of miles away, days before; and these in turn were determined in part by the movement of air masses across continental areas far remote from any ocean.

Similar applications of scientific oceanography for the needs of peaceful com-

merce, for the protection of beaches from the attack of eroding waves, for the planning of harbor works and navigation aids and for a hundred other purposes demand a well-organized and well-financed program of international scope, not only for the relatively exciting job of getting the original data but especially for the long and sometimes dull tasks of interpreting them and making the results promptly available for practical use.

Dr. Rossby called attention to the advantages already gained from international exchange of information among countries that have built up an extensive network of observing and reporting stations all around the northern hemisphere. This cooperation is possible largely through substantial agreement among meteorologists on methods and procedure, particularly through the universal adoption of the air-mass analysis method which originated in Norway a generation ago. He also suggested that it may become necessary soon to set up an equally far-flung net in the predominantly oceanic southern hemisphere, because of the long-range influence of the weather there upon events in the atmosphere nearer home.

Both speakers laid special emphasis on the great present need for training new workers for research in these two sciences, both of which are suffering from the double strain of rapid expansion and present understaffing.

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GENERAL SCIENCE

Freedom of Science Urged

► SCIENTISTS of the world were urged to unite in combating continued maintenance of wartime secrecyes now that the guns are silent, by Sir Henry Dale, past president of the Royal Society of London, who delivered the Pilgrim Trust Lecture before the meeting of the National Academy of Sciences.

"We have surely the right and the duty to give urgent warning of any danger threatened by those policies to the integrity of science, which we, the world's scientists, should hold as a sacred

trust not for any nation but for the world," Sir Henry declared. "I hold it to be our right and our duty to unite in telling the world insistently, that if national policies fail to free science in peace from the secrecy which it accepted as a necessity of war, they will poison its very spirit, . . . that science will languish, and that all the fair promise which it offers of a harvest of human prosperity, culture and happiness will be blighted and withered.

"We need only look at Hitler's Ger-

many to see how the enslavement of science, to prepare in secret for war, can in a few years destroy much of the true scientific activity which, not long ago, stood high among the gifts of a great nation. On such a matter we must be clear and uncompromising in our attitude."

Besides bringing the force of public opinion to bear on secretive officials, scientists can make a more direct and immediate application of their principle of freedom to speak and publish, Sir Henry suggested. They can insist upon that freedom for themselves as teachers and research leaders, and they can inculcate it, even by a kind of formal vow, in the young men whom they are train-

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ing to be the scientists of the future.

Formal action along the lines suggested by Sir Henry has already been taken by the International Council of Scientific Unions, representing eight international science organizations. Dr. John A. Fleming of the Carnegie Institution of Washington told the meeting of an outline of action adopted by the Council at a general assembly in London last July. In summary, this calls upon scientific workers:

"To maintain a spirit of frankness, honesty, integrity and cooperation, and to work for international understanding;

"To promote the development of science in the way most beneficial to mankind and to exert their influence as far as possible to prevent its misuse, and

"To serve the community not only by their specialized work but by assisting as far as they are able in the education of the public in the purposes and achievements of science"

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the top of the letter and low frequency for the bottom of the letter. These sounds create the blind reader's sound picture of the letter.

Almost any printed or typewritten matter can be read with the instrument, contrasted with the limited number of works available in Braille for the blind today.

The electronic reading aid was developed under the Committee on Sensory Devices of the wartime Office of Scientific Research and Development. The committee is now with the National Academy of Sciences.

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ELECTRONICS

Blind Can Read by Ear

For persons without sight an electronic device translates letters into sounds, making it possible to "read" almost any printed matter.

► BLIND PERSONS can read by ear with a new electronic reading aid which converts printed letters into distinctive sounds for the sightless reader. The machine was demonstrated to the public for the first time at a session of the American Philosophical Society by its inventors, Dr. V. K. Zworykin, Russian-born director of electronics research at the Radio Corporation of America laboratories, Princeton, N. J., and L. E. Flory.

To read with the electronic device, the blind person scans the printed or typewritten page with a stylus that looks like a large black fountain pen. A small beam of light in the "point" of the stylus moves up and down on each letter, reflecting to a phototube that operates an amplifier tube.

A combination of five different sounds is produced for each letter as the stylus moves over the printed matter. The reader hears the "pips" through a hearing-aid-like ear attachment. Total weight of the electronic unit is only five and one-quarter pounds.

Dr. Zworykin disclosed that work is now underway on an instrument using the same principles to form the actual sound of each letter. This would spell out each word for the blind person as he scanned print with the stylus.

The electronic reading aid shown in Philadelphia requires the reader to learn a code of sounds for each letter. Blind persons in several laboratories are now being taught the new system experimentally, Dr. Zworykin reported, adding that the device is not yet being produced commercially.

Flashing the beam of light vertically up and down each letter, the stylus reflects the black area of the letter as distinguished from the white page. A frequency modulated audio oscillator uses the reflected light from the printed letter to produce high frequency "pips" at

ELECTRONICS

Electronic Tubes Speed Up Mathematical Calculations

► ELECTRONIC "super-brains" that will solve complex mathematical problems a million times faster than the best methods available ten years ago were forecast before the meeting of the National Academy of Sciences by Dr. John von Neumann of the Institute for Advanced Study, Princeton, N. J. This dizzying speed-up in calculating ma-



HEARING AID—Electronic device, developed in laboratories of the Radio Corporation of America, operates as a stylus on a printed page, translating letters into sounds.

chines will come through the substitution of electron tubes and electrical circuits for the cogs and gears of mechanical devices hitherto in use, he said

New types of vacuum tubes, designed especially for these machines, are likely to be evolved, Dr. von Neumann predicted. Such special tubes will be needed especially for the parts of the machines that "remember" and carry over data for further operations.

The machines will require several thousand tubes each.

These electronic "super-brains" are, of course, unable to do any actual thinking. They accept problems at the hands of their human masters. But once a problem is set up they will simply run away with it, for they operate not with the speed of lightning but with the speed of light.

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PLANT PATHOLOGY

Alliance Wages Warfare On Stem Rust of Wheat

➤ CANADA, the United States and Mexico have found it necessary to form a three-power alliance in an unending war against a sub-human enemy, the black stem rust disease of wheat, Prof. E. C. Stakman, University of Minnesota plant pathologist, told the meeting of the National Academy of Sciences.

This is because the greatest wheat-growing area of the three countries is itself international. It starts in the northern states of Mexico, runs up the map of the United States in a wide zone from Texas to Montana and the Dakotas, and extends far up into the prairie provinces of Canada. An epidemic of wheat rust can get started in Mexico, become airborne through its billions of spores, and wind up by plaguing farmers in Saskatchewan. Under other circumstances, the spores may fly with the wind from north to south.

Plant breeders are constantly at work to produce new rust-resistant varieties of wheat, but their efforts are often set at naught by the wheat rust fungus, which is constantly evolving new strains, some of which are able to attack previously resistant wheat varieties. Hence it is necessary for wheat breeders and plant pathologists of the three countries to be constantly in touch with each other, exchanging information on the movements of the enemy and sharing their means for saving the wheat.

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BACTERIOLOGY

Disease Spread Studied

Germ warfare equipment and techniques developed during the war will be used to study transmission of disease germs through the air.

➤ EQUIPMENT developed during the war to handle the deadly "bugs" of bacteriological warfare has provided science for the first time with the means for studying the airborne transmission of the world's greatest scourges.

With the airtight chambers and elaborate equipment for washing "bugs" out of the air, University of California and Navy scientists have started a new approach to the study of such diseases as bubonic plague, influenza, psittacosis, and streptococcus infections such as rheumatic and scarlet fevers.

"We have a unique opportunity, with the war-developed equipment, to study airborne diseases under conditions which would have been impossible before the war," Dr. A. P. Krueger, leader of the new research program, says.

"The study of the transmission of these infections by air has been impossible because equipment did not exist which would eliminate the serious dangers to research personnel.

"During the war we had to develop equipment for safe handling of dangerous infectious agents, and this has

opened up a new field of great promise to medical science."

The University of California laboratories for airborne research were developed during the war when Prof. Krueger, as a captain in the Navy, led a group of scientists in the development of bacteriological warfare techniques.

To prevent infection of the researchers, experimental animals are handled in airtight chambers similar to those used in handling plutonium. Manipulation of animals and equipment is done with long rubber gloves which are sealed into holes in the chambers, a glass plate giving good visibility.

All air in the laboratories is washed through a bank of precipitrons, which separate all the "bugs" from the air, after which the air is passed over a bank of ultraviolet lights to kill any remaining disease agents. Any air which is suspect is burned in gas.

The isolation apparatus is of the type developed at the University of Notre Dame by Prof. James A. Reyniers, who served in California as an officer in the Navy during the war.

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AERONAUTICS

Pressure Pattern Flying

➤ A NEW technique, "pressure pattern flying," is now available to air pilots on the Atlantic route from Europe. It depends upon weather reports received from planes on the route, which are compiled and rebroadcast from New York to all craft in the air.

These radio reports from the pilots, digested and edited by personnel of the U. S. Weather Bureau, are broadcast from station WSY, operated by the U. S. Civil Aeronautics Administration. The service has just been put into operation by the CAA. It comes as a result of a request from the Meteorological Committee of the Air Transport Association of America.

This new technique consists in determining the shortest flight-time path to the destination by a series of late ac-

curate reports from other pilots flying the route which locates pressure areas and enables a pilot to take advantage of the airflow circling around them.

The principle of this technique is not entirely new. It has been experimented with by the Army and Navy air forces, and by several airline companies. The new broadcast over WSY, however, marks the first time that weather information from other craft has been collected and rebroadcast for this purpose.

Pressure pattern flying is considered advisable only for long overseas or trans-continental flights. The present service covers only about 800 miles on the trans-Atlantic route, but additional frequencies are being studied to give coverage over the entire distance.

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ORNITHOLOGY

**Vertical Flight Is
Nothing New to Ducks**

See Front Cover

➤ DUCKS may well look down scornful beaks at helicopters; vertical flight is nothing new to them. As demonstrated in the high-speed photograph of the mallard drake shown on the cover of this SCIENCE NEWS LETTER, a duck in a hurry to take off from the water goes right straight up for several feet before it begins to level off into horizontal flight.

The take-off actually starts in the water rather than on it. The bird's body is about one-third submerged, and the wings make one or two strokes into the water. Doubtless this action against a more resistant medium than air helps greatly in that first upward leap.

The cover photograph is one of several hundred that illustrate a sumptuous new book, *Prairie Wings*, in which both photography and text are by Edgar M. Queeny, with explanatory sketches by Richard E. Bishop, published by Ducks Unlimited, Inc. The artist-author is connected with the Monsanto Chemical Company; ducks are his serious hobby. It is more than just a book of magnificent duck pictures; in it a serious effort is made to understand the flight maneuvers of ducks in terms of what we know about aerodynamics.

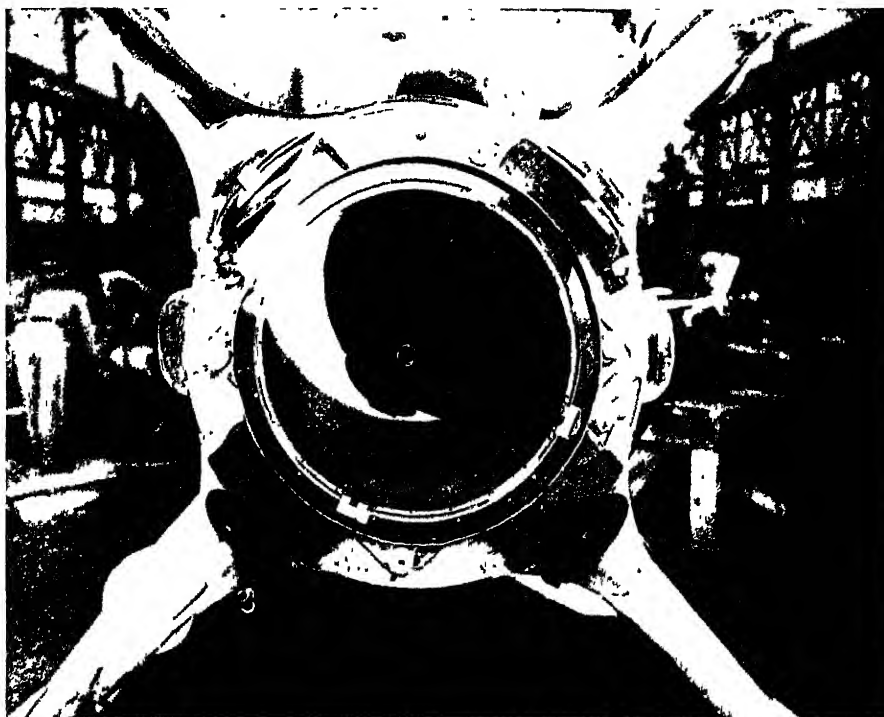
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GENERAL SCIENCE

**Prof. Joseph Proudman Wins
Alexander Agassiz Medal**

➤ THE NATIONAL Academy of Sciences awarded one of its highest honors, the Alexander Agassiz medal, to an English researcher on the mathematics of the oceans' tides, Prof. Joseph Proudman, F. R. S., director of the Liverpool Observatory and Tidal Institute. Since Prof. Proudman was unable to be present in person, the medal was accepted in his behalf by Sir Alfred Egerton, secretary of the Royal Society of London.

Two Americans were also presented with medals of the Academy. The Daniel Giraud Elliot Medal went to Dr. George Gaylord Simpson, paleontologist of the American Museum of Natural History. The Mary Clark Thompson medal was given to Dr. John B. Reeside, Jr., of the U. S. Geological Survey, whose field of research has been the Mesozoic of the central United States.

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V-2 ROCKET STERN—This projectile was sent aloft recently at White Sands, New Mex., to take automatic pictures at high altitudes. Arranged around the exhaust are six airplane gun type cameras. Official U. S. Navy photograph.

ARCHAEOLOGY

First New World Realists

➤ THE EARLIEST New World realists in art were the sculptors who 2,000 years ago carved the colossal stone heads unearthed in tropical lowlands of southern Mexico, Dr. Matthew W. Stirling, chief of the Smithsonian Institution's Bureau of Ethnology, told the Smithsonian's 100th anniversary convocation in Washington.

Five gigantic human heads were found during the past digging season. Dr. Stirling explained that the 11 heads found so far are the best preserved of all the stone monuments found in the Western hemisphere.

The same early Americans, who flourished before the time of Christ, invented the New World calendar which was adopted and complicated by the Mayas, with the earliest of whom the La Venta people were contemporary.

Two of the great stone heads discovered this year at San Lorenzo are each nine feet high. Some of the heads discovered earlier are being moved to Mexico City by the Mexican govern-

ment for permanent exhibition there.

The heads are so realistic and true to life that Dr. Stirling told an audience of world-famous academicians from many foreign countries that they are undoubtedly good portraits of what the early La Ventans actually looked like.

Later the Mayas developed a more gaudy and stylistic type of stone art, with an evident aversion to any blank spaces on their monuments which they covered with decorations. Dr. Stirling called this a mark of artistic degeneration.

The earliest date in the New World is the one corresponding to 31 B. C., carved on a monument from the Tres Zapotes site.

Eight years of archaeological exploration by a joint expedition of the Smithsonian Institution and the National Geographic Society, directed by Dr. Stirling, unearthed the new evidences of the La Venta culture, called Olmec in earlier reports. (See SNL, July 27, 1946.)

Science News Letter, November 2, 1946

CHEMISTRY

New Tablets Replace Army's "Canned Heat"

➤ NEW trioxane heat tablets for soldiers will be tested this winter in operations in Alaska and the Aleutians. Quartermaster Corps tests have shown the new tablet burns without odors or poisonous gases and produces a steady blue flame which is not easily blown out by wind.

During World War II both paraffin and alcohol heating tablets were used, but both proved unsatisfactory. The paraffin burned with a bright flame visible for some distance and deposited soot on the container. Alcohol heating, the Army simply states, "has been eliminated as not possessing the necessary characteristics for military use."

Hexamine tablets, also used in the war, will be tested further in Alaska, but these units are more sensitive to moisture, burn brightly and produce some poisonous gases.

The new trioxane tablets are approximately three inches long, one and one-quarter inches wide and five-sixteenths of an inch thick, producing enough heat to raise the temperature of a pound of water 100 degrees Fahrenheit.

Science News Letter, November 2, 1946

GEOGRAPHY

North Magnetic Pole Believed Moved 200 Miles

➤ THE NORTH magnetic pole isn't where it used to be, but just where it is now is a question scientists aren't agreed on. Since 1904, the imaginary point on the earth where the north-seeking compasses of the world's navigators point has moved at least 200 miles north and a little east or west.

Latest charts of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington, based on magnetic observations and the flight of the RAF Lancaster "Aries" in 1945, put the earth's north magnetic pole north and west in McClintock Sound or in Melville Sound, north of the Hudson Bay. Your geography book shows the classic location on the western side of Boothia Peninsula.

But other observations made on joint U. S. and Canadian Army maneuvers and by Canadian observers as far north as Fort Ross indicate the pole may actually have moved a little east and north. R. G. Madill of the Dominion Observatory in Ottawa told Science Service that

he believes the pole is now on North Somerset Island, which is north and east of Boothia peninsula in Canada's far north.

Mr. Madill expects the best answer to come when observations now being made from a U. S. Army B-29 are tabulated. Frequent flights in the area by this plane will give the latest and most accurate picture of the pole's location, Mr. Madill indicated.

Wherever the imaginary pole is, all observers are sure that it will prove to be at least 200 miles from the older location in a northerly direction.

And scientists believe there can be only one north magnetic pole. Russian scientists, a few weeks ago, claimed to have discovered another pole in Siberia, but that report is believed to have been due to mineral deposits that may create local magnetic "poles."

Science News Letter, November 2, 1946

MEDICINE

Is There Anything to Rainbow Wave Drug?

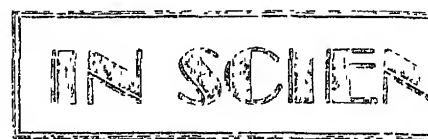
➤ AMERICAN scientists are wondering whether there really is anything in the "rainbow wave" drug developed by Japanese scientists and said to be effective in speeding healing of severe burns, ulcers, frostbite, tubercular leprosy and other diseases.

The drug, also known as Koha, is derived from neocyanine. Cyanine is a dye. Some scientists, inclined to be skeptical when they first read the report on Koha issued by the Office of Technical Services, U. S. Department of Commerce, recalled that other dyes have germ-killing or stopping power. The sulfa drugs came from a dye house. So these scientists think Koha should be investigated further.

This rainbow wave drug is a light-sensitive substance which Japanese scientists produced in an effort to find a chemical resembling chlorophyll, the green coloring matter of plants. They hoped to use chlorophyll's ability to convert sunlight into energy for treatment of various diseases. They were unable to obtain active chlorophyll, and experimented with neocyanine instead.

Koha, the rainbow wave drug, is given by injection into the veins. It is said to increase the number of white blood cells, stimulate formation of new tissue and increase the survival rate of damaged tissue cells.

Science News Letter, November 2, 1946



MEDICINE

Caffeine Does Not Stunt Growth

➤ THE OLD fear that drinking coffee, tea or other beverages containing caffeine stunted the growth and reduced the ability to have children is banished by experiments by Drs. George Bachmann, John Haldi, Winfrey Wynn and Charles Ensor at Emory University.

It is banished, that is, if humans react like the white rats in the experiments.

The rats, from the time they were weaned, drank a sweetened beverage containing caffeine as their only source of fluid. A control group of rats drank tap water only. The amount of caffeine the rats consumed daily would be equivalent to about 34 cups of strong coffee or tea.

The rats on the caffeine beverage grew at the same rate as those on tap water. Their reproductive capacity, judged by the number of litters and number of offspring, was not impaired. The sex glands of the males showed no changes except for those natural to the aging process.

Details of the experiments are reported in the *Journal of Nutrition*, (Sept. 10).

Science News Letter, November 2, 1946

MEDICINE

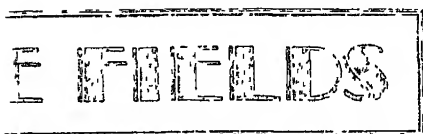
Streptomycin Cures Baby Of Tuberculous Meningitis

➤ A 15-MONTH-OLD baby boy, his parents' only child, has been saved by streptomycin from the almost always deadly tuberculous meningitis, Dr. Louis L. Krafchik of New Brunswick, N. J., reports in the *Journal of the American Medical Association* (Oct. 19).

The baby is one of only about 60 patients who have been cured of this disease, so far as medical records show. Even the 60 others who recovered may not all have had tuberculous meningitis. The authenticity of the diagnosis is questionable in many of the 60 cases, Dr. Krafchik states.

Five months after the start of this usually fatal disease, the baby was "clinically well," or, as the layman would put it, cured.

Science News Letter, November 2, 1946



AERONAUTICS

Navy Has New Safety Primary Training Plane

► A SAFETY cockpit design, with the cockpit enclosed by an unobstructed one-piece bubble canopy, features a new Navy primary training plane that has just made its initial test flight.

The cockpit design is a type which the Naval Bureau of Aeronautics sponsored in order to provide a standard for all its carrier-based aircraft. The one-piece canopy gives an all-around view to both instructor and student, a factor which aids in preventing collisions.

The new training plane will be known as the XNQ-1. It was constructed by Fairchild Engine and Airplane Corporation. It is an all-metal, two-place, low-wing monoplane with tandem seating arrangement. It is powered by a Lycoming nine-cylinder radial engine rated at 320 horsepower.

The gross weight of the XNQ-1 is 3,700 pounds, and its maximum speed is estimated at 170 miles an hour. It has a wing-span of approximately 41 feet and an over-all length of nearly 28 feet. Stability and control are emphasized in its design.

Science News Letter, November 2, 1946

PHYSICS

Smoke Affects Electric Conductivity of Air

► "SMOKER'S BREATH" can have a measurable effect on the electrical conductivity of the air. The difference can be measured by suitable instruments in an extremely delicate state of electrical balance—even if the smoker has thrown away his cigarette or knocked out his pipe before entering the laboratory building.

This is one of the more spectacular aspects in a study of air conductivity reported by Dr. G. R. Wait of the Department of Terrestrial Magnetism, Carnegie Institution of Washington, in the *Journal of the Washington Academy of Sciences*.

Air is ordinarily considered almost a perfect non-conductor of electricity, but it is able to conduct very small amounts, due to the presence of ultramicroscopically small charged particles, or ions. Larger particles, such as are found in

smoke, have little direct effect because of their low mobility, Dr. Wait explains. However, they absorb the small ions, thereby lowering the net conductivity.

All kinds of smoke particles are effective in this way. The air over large cities is less conductive than that over the open country—factory smoke is the answer. Even in the country, there is likely to be a zone of changed conductivity along the highway—gasoline fumes responsible in this case. A slow over-all decline in the conductivity of ocean air through a period of years is suspected to be due to slowly increasing smokiness of the atmosphere, even far off shore.

Science News Letter, November 2, 1946

MEDICINE

Atomic Diagnosis of Breast Cancer Is Hope

► HOPE OF diagnosing some types of breast cancer through atomic medicine, thereby avoiding much unnecessary surgery, is reported in the journal, *Science* (Oct. 25), by Dr. Bertram Low-Beer, University of California Medical School physician.

The diagnosis is made with radioactive phosphorus which has been found to concentrate in malignant (cancerous) tissue. After diagnosis of cancer by ordinary clinical means, an injection containing a tiny amount of radio phosphorus is given the patient.

The Geiger counter count on the skin surface over a malignant, fast-growing tumor is at least 25% higher than over the same spot on a normal breast. Benign tumors which may not call for surgery do not show this high concentration.

There has been no previous method for determining whether a tumor is benign or malignant in many cases. Therefore operations are performed in many cases of benign tumors on the possibility that they are malignant.

Dr. Low-Beer's report is preliminary and he says more research is necessary before the method can be applied in general practice. It cannot be used for deep-seated tumors because the beta rays' penetration is too short, nor can it be used for slow-growing malignancies because the differential concentration is not large enough.

The method has been used on 25 patients just before surgery. Microscopic examination of the cancer tissue after operation bore out the atomic diagnosis in all cases except one slow-growing malignancy.

Science News Letter, November 2, 1946

PHYSIOLOGY

Severe Physical Training Can Make Chest Smaller

► PULL-UPS, push-ups and all the exercises that go into a vigorous physical-training program will increase the chest measure of a thin man with a small chest, but if you already have a large chest, it may measure less after a severe training period.

That's what Dr. Carl C. Seltzer of Harvard University discovered from measuring the chests of 272 aviation cadets before and after an eight-week schedule of physical training.

Dr. Seltzer also tested the physical fitness of the cadets and found that the big fellows whose chest measurements had dropped showed the greatest improvement in fitness. They had been overweight, and their condition improved as they lost weight. At the same time their chests measured less.

In the men with small chests, Dr. Seltzer points out in the *American Journal of Physical Anthropology*, the increase in measurement was due to improvement in the chest muscles and better posture, not to movement of the ribs.

Science News Letter, November 2, 1946

INVENTION

New Blood Transfusion Apparatus Uses Rubber Bag

► BLOOD transfusion apparatus quite different from the type generally employed in this country has just been patented by a Swiss inventor, Rudolf Bucher of Basel.

Instead of the familiar inverted bottle, Mr. Bucher uses a flexible rubber bag to contain the whole blood or plasma to be placed in the patient's vein. This permits the force of gravity, ordinarily the sole reliance for producing flow of the transfused blood, to be supplemented if desired by pressure. Pressure may be applied in several ways directly to the outside of the bag, or it may be produced by inflating a small balloon inside the bag by an ordinary syringe bulb.

Between the bag and the outlet nipple to which the customary needle-bearing rubber tube is attached is a flat filter, to insure that no bubbles or solid foreign particles get into the patient's circulation. This filter is easily removable for cleaning and sterilization.

Rights in the patent, No. 2,409,734, have been assigned to the Swiss firm of G. Laubscher and Co. of Basel.

Science News Letter, November 2, 1946

NUTRITION

Pets Must Get Proper Diet

Studies of nutrition requirements for animals help to raise healthier pets and increase knowledge of human dietary needs.

By HELEN M. DAVIS

➤ ARE YOUR PETS getting enough vitamins? Has your pup enough pep? Do you know what to feed the white mice Junior brought home from school? Are you prepared to take on the nutrition problems of even stranger animals, if yours is one of those households that tends to acquire a private zoo?

If you were successful in raising the chicks and rabbits that well-meaning friends gave your children last Easter, you may by this time be considering a backyard live-stock project to augment the family food supply.

Whether you raise them for food or for fun, you will want your animal family to have a well-balanced diet, with the proper vitamin content. Your problems will be, on a smaller scale, those of the laboratory people who raise small animals generation after generation, to learn which foods are best for health, for growth and for raising better babies.

Studies of the vitamin requirements of animals aid in solving not only the problems of raising the animals themselves, but also problems of human nu-

trition. We can learn from rats and mice what kinds of food we should eat. Monkeys can show us how to avoid anemia. Hamsters offer suggestions on the care of our teeth.

Small furry animals beloved by children had their day at Chicago recently when nutrition chemists held a symposium on their food needs at the meeting of the American Chemical Society. Vitamins necessary to the health and happiness of dogs and guinea pigs, white rats and mice, and their wilder cousins, cotton rats and hamsters, were the concern of experts from agricultural experiment stations, pharmaceutical factories and government laboratories. Even monkeys and chickens were included in the list of animals whose dietary needs were examined.

Animals Need Vitamins

It is interesting to see that the vitamins required by the animals are the same as those now recognized as essential for human nutrition. Just as the careful housewife selects a well-balanced diet for her family and her pets with reasonable assurance that a varied diet of fresh foods will assure an adequate

vitamin allowance, so the people who are in charge of planning regular diets for flourishing animal colonies would employ the same system.

The people who work out the effects of single vitamin factors on diet use as a basis a diet which is completely free from vitamins so that the pure crystalline forms of the vitamin can be varied one at a time and the results studied.

It is obviously not necessary to buy vitamin pills at the drug store for your pets unless your veterinarian finds something wrong with their nutrition, but reputable manufacturers of prepared foods for animals realize the need for these food factors and the vitamin content of the animal food is usually stated on the label.

Healthy animals with bright eyes and sleek coats are the goal of nutritionists seeking complete diets. But, strange to say, although the guinea pig is the traditional laboratory animal, nobody knows exactly what its complete vitamin requirements are.

One reason for this is the individuality of the guinea pigs themselves. One pig will thrive on a diet which makes another droopy or susceptible to infections. Also, the experts believe, there are food factors not yet isolated which complicate the picture.

Rats Favorable for Study

Rats and mice are favorites for nutrition studies because they have lived so long in the same houses with people that they eat the same diet. If what is good for a man is good for a mouse, the opposite should also be true. A diet that keeps a mouse in excellent condition should give us ideas about feeding habits for the human species.

"Synthetic diets" for the mouse "can be prepared with adequate supplements of known pure vitamins which give excellent growth and maintenance of adult weight," says Dr. Harold P. Morris of the National Cancer Institute, Bethesda, Md.

Of the water-soluble vitamins, thiamin, riboflavin, pantothenic acid and pyridoxin are essential for growth and maintenance of adult weight. Other factors were discussed, and symptoms were described by which both acute and chronic vitamin deficiencies may be recognized.

Like the mouse, the rat has been used



HEALTHY BUNNY—Pet rabbits need a well-balanced diet if they are to have bright eyes and a sleek coat.

extensively for dietary studies, and many lists of rat diets have been published. Drs. R. A. Brown and M. Sturtevant of the research laboratories of Parke Davis found wide variation in the kinds and amounts of vitamins recommended by different authors. Some of these factors are essential to the welfare of the animals, these investigators believe, while others have in some cases been added "to forestall criticism by other workers."

They find that it makes considerable difference in some cases whether the vitamin preparation is swallowed or is injected under the skin, but that the result is not the same for all vitamins. It has been found, they report, "that vitamins A and D, when injected in an oil solution, are not utilized as well as when given by mouth. Thiamin and riboflavin at low doses are utilized more efficiently by the parenteral route than by oral administration. Pyridoxin or pantothenic acid give equal response whether they are injected or given by mouth."

Vitamins for Chickens

Considering the importance of chickens in human diet, it is not surprising that the importance of vitamins in the diet of chickens has received detailed attention. Dr. H. R. Bird of the Department of Agriculture's Bureau of Animal Industry lists quantities of vitamins recommended by various experimenters to be included per 100 grams of diet as: vitamin A 160 International units, vitamin D 25 A.O.A.C. units, thiamin 170 micrograms, riboflavin 300 micrograms, pantothenic acid 900 micrograms, nicotinic acid 1500 micrograms, pyridoxin 300 micrograms, biotin 10 micrograms, vitamin K 40 micrograms, and choline 130 mg.

At least 14 vitamins which have been isolated and crystallized have been found essential to the diet of the dog, reported Dr. Walter C. Russell of the New Jersey Agricultural Experiment Station's Department of Agricultural Chemistry, located at Rutgers University.

How the Monkey Helps

Monkeys, of late, have received increasing attention as laboratory animals, and the problem of keeping them in good health on a standardized diet was discussed by Drs. C. A. Elvehjem and K. B. McCall of the Department of Biochemistry of the University of Wisconsin.

Young Rhesus monkeys grow and develop satisfactorily when they are allowed to help themselves to a purified diet consisting of 73 parts sucrose, 18 parts vita-



LABORATORY PETS—Rats such as those shown drinking water are favorites for nutrition studies since they thrive on the same food as man.

min-free casein, 4 parts of certain mineral salts, 3 parts cod liver oil and 2 parts corn oil, supplemented by thiamin, riboflavin, pyridoxin, calcium pantothenate, niacin, vitamin C and a few other vitamin chemicals.

If they continue for a long period on this super-refined diet, however, they become slightly anemic, and, like their human cousins, find their red blood count improved by the addition of liver. Monkeys in the wild state do not, of course, use liver in their diets. But neither do they live on the kind of refined, vitamin-free diet given as the basis of experimental diets so that measured amounts of crystallized vitamins may be added to observe the difference they make in the condition of the animals.

Each vitamin removed from the monkey's diet shows up as a distinct kind of imbalance, which can be cured by putting back the specific vitamin required. If, after a long period on such a highly artificial diet, the monkey becomes anemic, the researchers find they can cure it by adding either liver or fresh milk to the menu.

New Animals Used

Among the newer animals grown as laboratory colonies, are cotton rats and hamsters. These small rodents, used for dental caries, virus and diphtheria studies, are reported to be more excitable than white rats, and therefore to need more careful handling. The hamster,

which has been studied by Dr. B. S. Schweigert of the Nutrition Laboratory of the Texas Agricultural Experiment Station, is reported to grow satisfactorily on thiamin, riboflavin, pantothenic acid and vitamin B₆, but to require additional vitamins for successful reproduction and lactation.

Science News Letter, November 2, 1946

ATOMIC ENERGY CONTROL

The official text of the First Report on the Scientific and Technical Aspects of the Problem of Control, as prepared by the Scientific and Technical Committee of the United Nations Atomic Energy Commission.

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Do You Know?

Foxes sometimes play dead in an attempt to escape enemies.

Strawberries keep better if picked in the morning while still wet.

Cellulose exists in almost pure form in cotton.

Egg albumen substitutes were produced in Germany during the war from waste fish and from poor-quality milk and whey.

About one-third of the *lambs* born never reach market; better care at birth, proper feeding and control of parasites could reduce this loss.

Vanillin, within the past decade, is obtained from lignin, a by-product of pulp and paper mills, lignin from coniferous woods being used chiefly; after purification the product has fine vanilla aroma.

Due to conversion of some of the great *explosive plants* to fertilizer production, farmers are now being assured the largest nitrogen supply for their crops they have ever had.

In the two states of Oregon and Washington there is enough commercial *saw timber* at present to build 73,000,000 five-room houses, or two houses apiece for every family in the United States.

Crude fats are being used since the war for making high-grade soap and soap flakes; formerly used only for harsher laundry soaps, a process involving the use of sodium chlorite now gives them wider use.

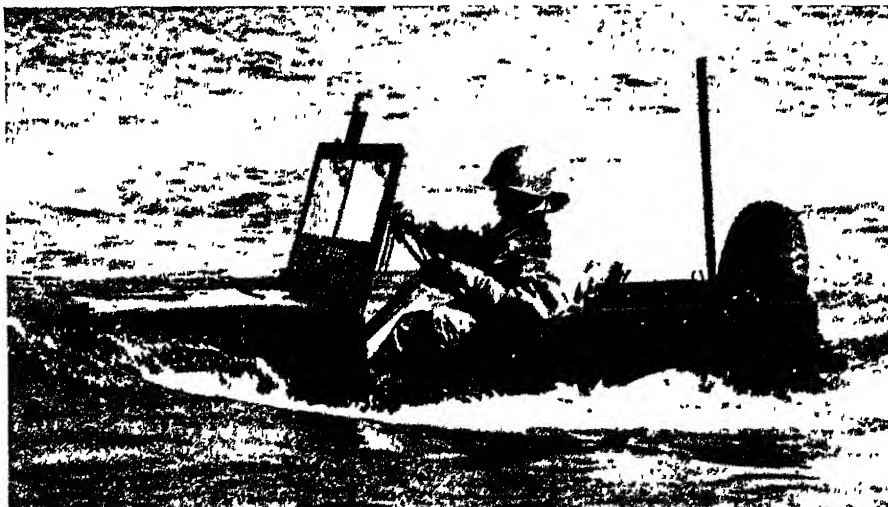
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SUBMARINE JEEP—"Deep-water fording kits" equip jeeps for underwater operation at beaches and in fording streams. The jeep is made operable in water one foot higher than the hood for a period of 15 minutes. (See SNL, Oct. 26.) Official U. S. Navy Photograph.

AERONAUTICS

Planes Made of Plastic

Glass fiber plastic wings for planes meet strength tests. Operational advantages include efficiency for high speed, heat resistance and resiliency.

► AIRPLANES of the near future may be made of glass—not the windowpane variety, but glass fiber bonded in resin to form a strong plastic.

Wings of this material, designed and constructed by the Army Air Materiel Command, have now proved in flight that they meet all strength requirements and have other advantages.

A fuselage of the same material has satisfactorily passed service flight tests covering hundreds of flying hours both in the United States and in Alaska.

An all-glass-fiber airplane is the acknowledged objective of Army aviation engineers. The all-glass fiber fuselage tested 50% stronger on a strength-weight basis test than the standard metal fuselage. The all-glass-fiber wing withstood 105% of the required load without any buckling or wrinkling occurring in its glass-like surface.

The plastic used is composed of 55% glass fiber and 45% resin. The basic process involved in the fabrication of a laminated glass wing is relatively simple. Cloth woven from glass fiber is impregnated with resin in a simple semi-automatic coating machine. Layers of this are

laid in an inexpensive mold conforming to the finished contour of the wing.

Strips of light-weight cellular cellulose acetate are wrapped with a thin layer of glass cloth to form a core of a sandwich construction. Next, additional sheets of the impregnated glass cloth are laid over the core to complete the sandwich. Heat and pressure are then applied. The completed new wing, which is made in two halves and then bonded together, provides a clean interior entirely free of the ribs and cross-bracing of conventional metal wings.

Operational advantages of the glass fiber wings include efficiency for higher speeds because the glass-like surface has none of the rivets and joints of metal wings. Also, their greater rigidity results in smoother flow of air over their surfaces.

Other features of the glass wing include heat resistance and resiliency, which will perhaps make it adaptable for supersonic speeds. Its electrical characteristics make it particularly suited for applications in the construction of pilotless planes directed by radar.

Science News Letter, November 2, 1946

GENERAL SCIENCE

UNESCO Project Proposed

International student exchange is urged as an aid to world peace, and the work of UNESCO is described to the National Academy of Sciences.

► INTERNATIONAL exchanges of students, with large numbers of young men and women from foreign universities attending American institutions while American youth studies abroad, is one of the most important contributions to world peace that can be made under the UNESCO setup, declared Prof. Robert Andrews Millikan of the California Institute of Technology, before the closing session of the National Academy of Sciences meeting.

Something of the kind was contemplated under the old League of Nations' committee on international cooperation, Prof. Millikan recalled, from his long service with the scientists of other nationalities. It failed of fruition partly because of the onset of worldwide hard times in the 1930's, but more fundamentally, he feels, the failure was due to the refusal of the United States to participate in the League after we had been largely instrumental in its creation. The fact that we have definitely committed ourselves to permanent participation in the program of the United Na-

tions, he added, "makes the future bright with hope."

The present work and future hopes of UNESCO were outlined before the meeting by Prof. W. A. Noyes, Jr., of the University of Rochester. In prewar days, he pointed out, the political isolationism of this country tinged our attitude toward international cooperation in scientific and intellectual fields; Americans participated in the work of international scientific unions, but primarily as individuals.

This is radically changed now; this country is committed to as full participation in the educational, scientific and cultural activities of the United Nations as any other member. There is a seven point program ready for action, as soon as the formal tasks of organization can be taken care of. It calls first for hastening the work of scientific rehabilitation in the devastated areas of the world, and at the end looks forward to the undertaking of new international scientific projects.

Science News Letter, November 2, 1946

PSYCHOLOGY

"Mental Bugs" Itch, Bite

► MORE PATIENTS suffer from the mental delusion of having bugs on their skin than is generally realized, two University of California Medical School skin specialists believe. The specialists are Dr. J. Walter Wilson, now of Los Angeles, and Dr. Hiram E. Miller.

The person who suffers from this delusion should see a psychiatrist, not a skin specialist, they advise.

The two physicians found only 45 cases reported in medical literature, and added six cases they had seen personally. They said the delusion is more widespread than these figures indicate.

Nearly all patients with the ailment report that their nonexistent parasites itch, while other common activities of the imaginary bugs are crawling, creeping, biting, scratching, sticking, digging, burning, knocking, and clicking.

Drs. Watson and Miller said that the ailment is an indication of a deep-seated mental illness, such as psychosis, involutional melancholia and paranoia. Most susceptible to treatment by the psychiatrist are the cases of psychosis which are caused by alcohol or drug addiction, and involutional melancholia, the mental deterioration which sometimes occurs in middle and old age.

The physicians found that many patients went to great extremes to rid themselves of their mental bugs. One slept on a clean white cloth on a wooden bench, the better to keep clean. One woman soaked her head in kerosene night and morning, bathed every day, and scraped her body with a knife.

Youngest of the patients with the delusion was 30, while most of them were in their 40's and 50's.

Science News Letter, November 2, 1946

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Edited and Prefaced by

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MINERALOGY

International Mineral Control May Check War

➤ INTERNATIONAL knowledge of where minerals are, and international control of their distribution, may serve as a brake on the waging of war, suggested Prof. C. K. Leith, University of Wisconsin geologist.

Realization of the vital military importance of certain key minerals is at present causing some of the nations that have them to be very reluctant to let go of them. Some of the possessing powers have gone so far as to nationalize their critical mineral resources and place an embargo on exports. Other controls are less drastic.

Admitting that "as yet, anything approaching agreement on any form of international control of minerals remains in the field of wishful thinking," Dr. Leith nevertheless expressed the conviction that such controls will eventually come, and he sees a worldwide trend toward it, regardless of political ideologies or conditions of war or peace.

Science News Letter, November 2, 1946

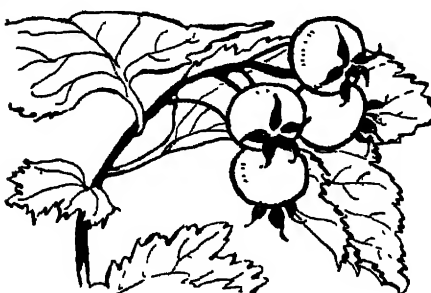


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Neglected Natives

➤ WITH AUTUMN well advanced, and most leaves fallen, now is a good time to look about and take stock of the offerings of our native trees and shrubs. There is a great abundance, but nobody seems to want more than a nibble of it.

A peculiarly American tree, at least so far as edible fruits are concerned, is the hawthorn. Some of our species produce soft-fleshed haws that are really a unique experience in tangy taste; yet except for omnivorous small boys, and a very little local jam-making, they are neglected altogether. It should be worth some patient plant breeder's time to work on this fruit with an eye to larger size, and perhaps better resistance to worminess.

Every year our wild crabapple trees produce immense crops of fruit, practically none of which gets eaten. There is good enough cause for this neglect, for these wild crabapples are very hard, and overloaded with puckery tannin besides. Yet our prize Jonathans and Wealthies and Grimes Golden came from Asiatic ancestral stock that was not much better to begin with.

Our wild persimmons really are appreciated, though never systematically cultivated. When American orchardists decided to grow persimmons, they sent to Japan for trees that produce fruits that get to be as big as baseballs, though the flavor is scarcely equal to that of our native species.

American wild grapes have fared rather better. Several native species, notably in the East and Southeast, are really quite good in their wild state; with selection and intercrossings they have provided such standard cultivated

stocks as Concord, Scuppernon and Catawba. Even European viticulturists have not been too proud to introduce American strains into their hybrids.

Only one native American nut tree, the pecan, has won its way into large-scale cultivation. Its botanical second cousin, the shellbark hickory, has meat that is at least as good; but there are no shellbark "orchards." Nuts with thin, easily cracked shells seem to be the decisive factor, for we also find our native black walnut, with delicious meat but a case-hardened shell, left uncultivated while thousands of acres on the West Coast are planted to the English walnut, which is easily opened but not nearly as good eating.

Science News Letter, November 2, 1946

GENERAL SCIENCE

Science and Art Are Allies, Not Competitors

➤ POETS, ESSAYISTS, humanists generally should lay aside their traditional aversion to exact science, an astronomer told the Princeton bi-centennial conference on the humanities in Princeton.

Dr. Harlow Shapley, director of Harvard College Observatory and president of Science Service, confessing that he had at one time aimed at a literary instead of a scientific career, declared that the sciences and the humanistic tradition are not too far apart, "if we lop off or ignore at one end the unthinking mechanist and at the other end the unthinking dilettanti."

"The sympathetic approach by the non-scientist toward the contents and goals of science should pay well in units of philosophic comprehensiveness as well as in artistic material," Dr. Shapley said.

Our introspective artist should reorient himself in the content of present human knowledge, Dr. Shapley argued. He should contemplate deeply, not superficially, "the vibrant oscillations in the electron tubes, the geometries of protein structure, the sculpture of beetle backs, and the majesty of the cosmic processes that play with bursting stars, with radiation that penetrates bones and iron, with time-scales for galactic evolution that tempt the unwary to speculate on creation."

The artist would then find, Dr. Shapley assured the conference, that modern science is his cooperative ally, and not his heartless opponent.

Science News Letter, November 2, 1946

Books of the Week

ANTIBIOTICS: Parts I and II—Roy Waldo Miner, Ed.—*New York Academy of Sciences*, 187 p., illus., tables, and graphs, \$2.50 Vol. XLVIII, Art. 2.

THE ART OF RUSSIA—Helen Rubissow—*Philosophical Library*, 32 p., 160 full-page illus., \$6. This volume offers for the first time a comprehensive selection of Russian paintings, from the 14th Century icons to works of recent Soviet artists.

AS HE SAW IT—Elliott Roosevelt—*Duell, Sloan & Pearce*, 270 p., \$3. The story of Franklin D. Roosevelt's global thinking and of the aims behind the conferences that shaped the victory and set the framework of the peace. Based upon discussions, notes, correspondence, first-hand observations and intimate talks with FDR, it discloses a great number of new, astonishingly revealing facts about him.

A CATALOG OF PROVISIONAL COORDINATE NUMBERS FOR THE METEORITIC FALL OF THE WORLD—Frederick C. Leonard—*Univ. of New Mexico Press*, 54 p., \$1. Univ. of New Mexico Publications in Meteoritics, No. 1.

THE CENTENNIAL OF SURGICAL ANESTHESIA—Compiled by John F. Fulton, M.D., and Madeline E. Stanton—*Schuman's*, 102 p., illus., \$4. An annotated catalogue of books and pamphlets bearing on the early history of surgical anesthesia, October 1946.

ESSAYS ON GROWTH AND FORM—W. E. Le Gros Clark and P. B. Medawar, Eds.—*Oxford*, 408 p., illus., tables, and graphs, \$6. This volume of essays is published as a tribute to D'Arcy Wentworth Thompson on the occasion of his completing sixty years as a professor. They have been prepared by his fellow workers in only one of the fields which he has made his own, namely that covered by his treatise, *ON GROWTH AND FORM*.

FOR THIS WE FOUGHT—Stuart Chase—*Twentieth Century Fund*, 123 p., \$1. The author of this book examines the goals that Americans want for their country, emphasizes our abundant power to produce, and gives his ideas on how we should organize to establish prosperity and preserve peace in the atomic age. No. 6 and

final report in the series *WHEN THE WAR ENDS*.

THE MAGIC OF NUMBERS—Eric T. Bell—*Whittlesey House*, 418 p., \$3.50. The author has made this book much more than a specific search for origins of mathematical thought. In its entirety it becomes a human history of the development of numerical theory, a living biography of the men who played and are playing such a great part in our scientific and philosophical development.

MAKE-OVERS FROM LEATHER, FUR, AND FELT—Clarice L. Scott—*Gov't Printing Office*, 16 p., illus. and diagrs., paper, 5 cents. U. S. Dep't. of Agriculture Misc. Pub. 614.

MERRILLEANA—Elmer D. Merrill—*Chronica Botanica*, 266 p., plates and illus., paper, \$4. A collection of studies in the method and history of biology and agriculture. *Chronica Botanica*, Vol. 10, No. 3/4.

A MEMOIR TO THE ACADEMY OF SCIENCES AT PARIS ON A NEW USE OF SULPHURIC ETHER—W. T. G. Morton—*Schuman's*, 24 p., \$1.50. Historical Library, Yale Medical Library Publication No. 14.

MY EYES HAVE A COLD NOSE—Hector Chevigny—*Yale Univ. Press*, 273 p., \$3. In this book the author tells the complete story of his blindness, its onset, and how he has gone on with his profession of radio writing against the subtle and very powerful forces that tend to keep the blind and otherwise handicapped as protected wards of society instead of people who are often capable of making their own way.

PSYCHOLOGY IN ACTION—Joseph Clawson—*Macmillan*, 289 p., illus., \$4. This book offers unique help to the person who wants to understand human nature and to influence the behavior of others.

RADIO'S CONQUEST OF SPACE. The Experimental Rise in Radio Communication—Donald McNicol—*Murray Hill Books, Inc.*, 374 p., diagrs. and illus., \$4. Here is the personalized history of what we know today as radio. It is the story of the men whose skill and imagination produced the inventions and refinements that have made radio a vast peacetime business and a formidable wartime weapon.

SCIENTISTS AGAINST TIME—James P. Baxter, 3rd—*Little, Brown and Co.*, 473 p., illus., \$5. This book reveals the official inside story of the Office of Scientific Research and Development. It tells of the plans, the hopes, the endless experiments, the unremitting labor that lay behind the ultimate success of our scientists in outstripping the enemy.

SCRIPTURAL PSYCHIATRY—Morris Braude, M.D.—*Froben*, 159 p., \$5. A popular presentation of an hitherto little explored source in mental hygiene.

Science News Letter, November 2, 1946

New sunflower seed, capable of producing 49% more oil than ordinary varieties has been developed in Canada.

MEDICINE

Three Weapons Fight Influenzal Meningitis

► WHEN a baby gets a mild or moderately severe attack of influenzal meningitis, streptomycin will save him. But if he has a severe attack, with injury to the brain cells, his doctor needs to use rabbit anti-serum and sulfadiazine with the streptomycin in an all-out attack.

This lesson, learned from experience with 25 babies ranging from five months to three years seven months in age, is reported by Dr. Hattie E. Alexander and Grace Leidy, of Columbia University College of Physicians and Surgeons, and Drs. Geoffrey Rake and Richard Donovan, of the Squibb Institute for Medical Research, in the *Journal of the American Medical Association* (Oct. 26).

Influenzal meningitis used to be 100% fatal. With the advent of sulfa drugs and antiserum, the mortality was reduced to about 30%.

Science News Letter, November 2, 1946

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New Machines And Gadgets

☼ **CONVERTIBLE** rocking chair, recently patented, has rockers hinged to its front legs so that they can be swung upward between the four legs until their rear ends rest inside the chair's back. A convenient lever, operated by the occupant while sitting at ease, raises or lowers the rockers.

Science News Letter, November 2, 1946

☼ **PRECISION** plumb bob for carpenters and engineers has a spool on its upper neck which revolves to wind up the suspension cord. To use, the cord is pulled out to approximate length, then slipped under a hook on the top that holds it in an exactly centered position. The cord can be shortened by revolving the spool.

Science News Letter, November 2, 1946

☼ **AIR SPRINGS**, in pairs at each end of each axle on railroad passenger cars, look like small automobile tires lying in a horizontal position. The nine-inch-diameter rubber air containers are connected to an air reservoir that acts as a shock absorber when a wheel hits unevenness on the track.

Science News Letter, November 2, 1946

☼ **ADJUSTABLE** swing, to keep Johnny happy during shut-in days, is fixed in the door frame, as shown in the picture, so that it does not interfere with door action. The seat-height is adjusted by



clamps on the side straps. The swing can be unhooked from the cross arm when not in use.

Science News Letter, November 2, 1946

☼ **SEEING-EYE** for blind men is a nine-pound case the size of a loaf of bread that is carried in one hand. A beam of light projected from the case is reflected by an object ahead, picked up and converted by a photocell into code signals in the blind user's earphone.

Science News Letter, November 2, 1946

☼ **TRANSLUCENCY** meter, a new photoelectric instrument, measures more accurately than ever before the translucency of chinaware. This property in chinaware imparts its fragile beauty and is the buyer's criterion of quality. The instrument will aid ceramists in research and may be adaptable to production control.

Science News Letter, November 2, 1946

☼ **ARTIFICIAL EYE**, that moves in coordination with a person's good eye, is made of plastic with a mesh of tantalum metal covering its back portion. Mobility is obtained by sewing the eye muscles to the tantalum mesh. It can be implanted immediately after an injured eye is removed, or much later if desired.

Science News Letter, November 2, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 335. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

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Question Box

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PSYCHOLOGY

How do "mental bugs" annoy patients? p. 285.

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SCIENCE NEWS LETTER



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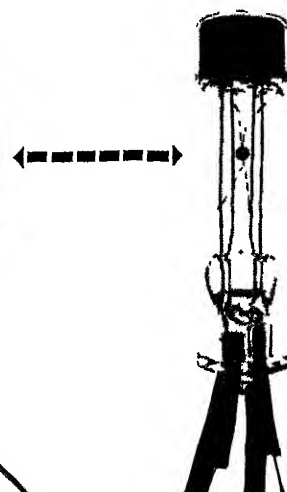
The Eye That Never Closes

You are looking at a thermistor — a speck of metallic oxide imbedded in a glass bead hardly larger than a pin-head and mounted in a vacuum. The thermistor was developed by Bell Telephone Laboratories to keep an eye on the amplification in long-distance telephone circuits.

When a thermistor is heated, its resistance to electric current changes rapidly. That is its secret. Connected in the output of repeater amplifiers, it heats up as power increases, cools as power decreases. This change in temperature alters the resistance, in turn alters the amplification, and so maintains the desired power level. Current through the wire at the left provides a little heat to compensate for local temperature changes.

Wartime need brought a new use for this device which can detect temperature changes of one-millionth of a degree. Bell Laboratories scientists produced a thermistor which could "see" the warmth of a man's body a quarter of a mile away.

Thermistors are made by Western Electric Company, manufacturing branch of the Bell System. Fundamental work on this tiny device still continues as part of the Laboratories program to keep giving America the finest telephone service in the world.



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MEDICINE

Nobel Prize is Awarded

Award climaxes honors to American, who discovered that genes of the fruit-fly can be destroyed or dislodged to change heredity.

➤ AWARD of the Nobel Prize in medicine and physiology to Prof. Hermann Joseph Muller of Indiana University constitutes recognition of 20 years of solid devotion to one research goal—better knowledge of genes, the ultramicroscopic chemical entities that rule the hereditary makeup of all living things, from molds to men.

Twenty years ago Prof. Muller, then at the University of Texas, discovered that he could destroy or dislodge genes in the reproductive cells of the little fruit-fly, *Drosophila*, by bombardment with X-rays. New generations of fruit-flies appeared in his rearing cages, with changed eye colors, differently-shaped wings and other sudden evolutionary alterations of the type known as mutations.

He announced his discovery early in 1927. Recognition of its importance came quickly, and at the first midwinter

meeting of the American Association for the Advancement of Science following the announcement, he was awarded the \$1,000 prize of the Association. Other recognitions and honors followed, to be climaxed by the just-announced Nobel Prize.

For a few years before the war, he was in various European countries, collaborating with fellow-geneticists in their laboratories. He was at Amherst College from 1942 until he went to Indiana University 14 months ago.

Word of the Nobel award came while he was attending a conference on theoretical physics at the Carnegie Institution of Washington. Interviewed at the conclusion of a session, he stated that he is still pursuing the same type of knowledge, and still using the same prolific little insects as material. He has added radium radiations to X-rays as weapons of genetic bombardment.

Science News Letter, November 9, 1946



GENETICIST—Prof. H. J. Muller, who was awarded the Nobel Prize in Medicine and Physiology.

humans. It will not be made available generally until results of its use in study groups are known.

Science News Letter, November 9, 1946

RADAR

Anti-Collision Radar To Make Flying Safer

➤ ANTI-COLLISION radar, new lightweight equipment compact enough for average commercial and military transports, is now entering final development and production by General Electric. One special feature is its antenna-control by gyroscope.

The new equipment, weighing from 100 to 150 pounds, is designed as a unit, economical in cost and space requirements, suitable for common use in planes large enough to carry five or more passengers, and of the type that can be utilized in present planes by present crews. It is designed to lessen hazards of flying both in overcast weather and in darkness.

It is an improvement over the five-control radar equipment that General Electric has been constructing for the Army. An outstanding feature is the gyroscopically stabilized antenna so that the shadow image on the radar screen or scope is unaffected by the banking, climbing or diving of the plane. This improvement is expected to remove one of the main limitations to general use of the equipment during flight.

The new radar will have about eight times more power than the previous Army model, and its maintenance is simpler. It will also have a wider range. The range of its predecessor, the Army APS-10, is approximately 90 miles.

Science News Letter, November 9, 1946

MEDICINE

U. S. To Try BCG Against TB

➤ WHEN 100,000 Americans get vaccinated against tuberculosis some time next year, it will be a vindication of a method of fighting tb which has for almost 20 years been largely repudiated by health and medical authorities in this country.

The vaccine to be used is named BCG. The letters mean bacillus of Calmette and Guérin. These French scientists developed the vaccine at the Pasteur Institute in Paris in the 1920's. It is made from living tuberculosis germs which have been weakened so they do not cause the disease but do produce resistance to it.

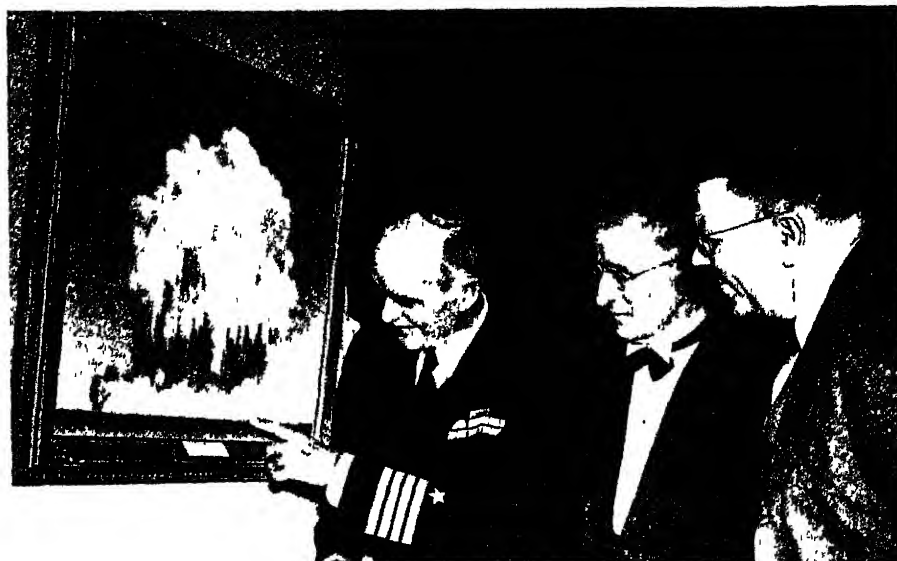
A disastrous experience occurred years ago in Luebeck, Germany, when virulent germs accidentally got into the vaccine and the vaccinated children got tuberculosis instead of being protected against it. This helped strengthen the conservative attitude of many American scientists who had already felt it was dangerous to inject living tuberculosis germs into babies and children.

Careful studies of the vaccine, however, have been carried on for some years in this country and it has been widely and successfully used in Europe and South America.

Now the U. S. Public Health Service, on the recommendation of outstanding tuberculosis authorities, will launch anti-tuberculosis vaccinations on a large scale. First to get the vaccine in this new project will probably be persons living in regions where there are no hospital beds for tuberculosis. Under such conditions babies and children are exposed to the germs because the patient has to stay at home, instead of going to a sanatorium for treatment and isolation during the time he is spreading virulent germs.

Nurses and other personnel in hospitals and sanatoria will probably also be given the vaccine for their protection.

The vaccine will be made in this country from a fresh culture to be obtained from the Pasteur Institute. Tests on animals will come before it is given to



ARTIST-SCIENTIST—Capt. Charles Bittinger, physicist who painted for the Navy the Bikini atom bomb explosion, shows his picture of Baker explosion to Dr. Vannevar Bush (center), president of the Carnegie Institution of Washington and wartime director of OSRD, and Dr. Edward U. Condon of the National Bureau of Standards at the reception commemorating the hundredth birthday of the Smithsonian Institution.

MEDICINE

Erythrin vs. Diphtheria

Penicillin-like antibiotic comes from red blood cells of rabbits. Discovery may open a whole new branch of science of antibiotics.

► A NEW penicillin-like drug extracted from the red blood cells of rabbits and other animals is now under clinical trial as a weapon against diphtheria in several Moscow clinics.

First-hand account of this new development in disease-fighting is being given American scientists by Dr. Vassily V. Parin, secretary general of the Academy of Medical Sciences of the USSR and professor of physiology at the Third Moscow Medical Institute. Dr. Parin is visiting here at the invitation of Surgeon General Thomas Parran, U.S. Public Health Service.

Erythrin is the name of the new antibiotic. It is the first such substance extracted from higher animals. Penicillin comes from a mold and the famous KR anti-cancer vaccine under trial in Russia comes from a protozoa, but this form of animal life is very low in the animal kingdom.

The new antibiotic from rabbit blood cells was discovered by Dr. L. A. Silber of Moscow. It is very effective against

different kinds of disease germs and particularly against the germs of diphtheria.

Diphtheria patients and healthy carriers of diphtheria germs are at present being treated with erythrin. The antibiotic gets its name from the medical name for red blood cells, erythrocytes. Red cells from other common laboratory animals, such as guinea pigs and white rats, also are sources of the substance but Dr. Silber has found the erythrin from rabbits the most effective.

A whole new branch of the science of antibiotics may be opening as a result of this discovery, Dr. Parin stated.

The KR vaccine, he emphasized, cannot be recommended for use on cancer patients yet except those treated under the personal supervision of Dr. Nina Klueva, who with her husband, Dr. Gregory Roskin, developed it from trypanosomes, germs that cause Chagas disease. Some but not all of the few breast and skin cancer patients treated have recovered clinically. Not unless and until they have remained free of cancer for

five years, however, will doctors in Russia or elsewhere be satisfied that the vaccine is a cure for cancer. So far, it is only a few months since these patients have been treated. No patients with internal cancers have yet been helped by the vaccine.

Science News Letter, November 9, 1946

The first wire suspension bridge in America was built 140 years ago across the Schuylkill river near Philadelphia

Solutions containing 5% rotenone will destroy over 90% of the cattle grubs and all of the lice on the animals treated.

SCIENCE NEWS LETTER

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ASTRONOMY

Sun-Spectrum Lengthened

Radiations of the sun up to 65 miles above the earth's surface, past the ozone, were photographed by equipment carried in V-2 rocket.

➤ RADIATIONS from the sun, never seen before, have been photographed.

Much may be learned about the sun, our primary source of energy, because of photographs taken of the sun's spectrum by a camera carried high into the air by the V-2 rocket fired on Oct. 10. About 40 of these spectrograms, made at increasing altitudes up to 65 miles above the surface of the earth, are being studied at the Naval Research Laboratory in Washington, D. C.

The new lines in the sun's spectrum are being identified and their intensities calculated. Scientists estimate that a full year will be needed actually to analyze the data.

The spectrograph used to extend the sun's spectrum was mounted on a rocket fired at the Army's White Sands Proving Grounds in New Mexico. The Naval Test Unit and Army Ordnance Department at White Sands worked together in conducting these experiments.

As the rocket rose, the spectrograph operated continuously, producing a series of photographs at various altitudes

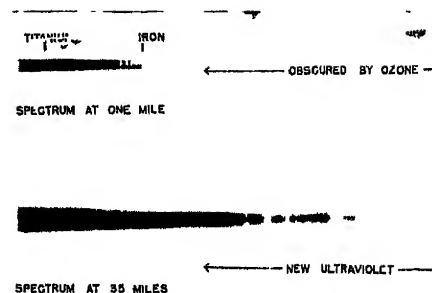
up to 65 miles. Rotation of the rocket turned the spectrograph away from the sun above that height, so spectrograms could not be made.

The sunlight that reaches the earth is filtered by the ozone in the atmosphere, most of which is concentrated near the earth. Only a small proportion of the shorter wavelengths, those lying on the X-ray side of the visible spectrum, ever reaches the ground surface.

Since life on the earth's surface would almost certainly be destroyed by these shorter wavelengths in the solar radiation, it is quite fortunate that they are stopped by the ozone layer. But the blacking out of the lower end of the spectrum is tantalizing to the scientist.

In the past much has been learned about the sun from careful studies of the sun's spectrum obtained at the earth's surface. Helium, for instance, was discovered in this manner on the sun before it was found on the earth. These new spectrograms may give new clues to the nature and quantities of the various elements composing the sun.

Science News Letter, November 9, 1946



ABOVE THE OZONE—The sun's spectrum has been extended many Angstroms through photographs taken from the V-2 rocket. The spectrum of the sun taken 35 miles above the earth's surface is compared above with one photographed at one mile. Official U. S. Navy photo.

GENERAL SCIENCE

Draft Almost Ruined War Science Projects

➤ THE MIRACLES of science that brought victory to America and her allies in the war came close to not happening at all, thanks to the almost incredible genius for "snafu" exercised under the misnamed Selective Service system. Local draft boards, blindly filling their quotas with all the men they could grab, regardless of their training and special values to the war effort, kept trying to send research men to camp to train as infantrymen. Top rank scientists in Washington had to spend hours and days of their valuable time fighting to get their helpers back again.

These disturbing facts are disclosed in *Scientists Against Time*, first official account of the work of the Office of Scientific Research and Development, by James Phinney Baxter 3rd, published by Little, Brown and Company.

Dr. Vannevar Bush, commander-in-chief of American research forces, wanted a National Service Act that would make the special training and talents of men available where they would do the country the most good. Instead, the Congress passed a Selective Service measure calculated to produce the most fox-hole diggers. That the OSRD was able to produce such war-winning devices as rockets, radar, amphibious vehicles, and finally the atom bomb can be credited to the persistence of scientific workers in the face of mismanagement.

Science News Letter, November 9, 1946

PSYCHIATRY

Democratizing Germans

➤ IF WE CAN teach the Germans that children are people, not puppets, and that presidents and other political rulers are also people, we shall have taken a big step toward weaning them from Nazism. That this can be accomplished was shown from results of the democratization program among German prisoners of war at Fort Getty, Rhode Island, reported to the National Committee for Mental Hygiene meeting in New York.

The prisoners in this first experiment of its kind learned to have more warmth in personal relationships. From that step, they came to a more human and less literal idea of public affairs, Dr. Richard M. Brickner, psychiatrist of New York, reported.

Before their indoctrination in democ-

racy the typical prisoner took authoritarianism as a natural thing because he was used to it from childhood. The father was the tyrant who exercised authority for authority's sake and the son grew up anxious to be old enough to get even by bossing someone else. All the buried hostility toward fathers was vented upon this somebody else.

Talking to Germans about war guilt is like talking Sanskrit, Dr. Brickner said. They do not feel any guilt because the structure of German society is a hierarchy, where each man has a superior and an inferior. The weight of the guilt is distributed through the hierarchy which can absorb it like the beams of a building so it does not become too great for an individual to bear.

Science News Letter, November 9, 1946

AERONAUTICS

New Glider Operates With Revolving Blades

➤ A STRANGE air "bird" has been revealed. It is a craft without wings or engine. It is a type of glider that is eased down to the earth by the rotating action of horizontal revolving blades.

This experimental model is a simple affair, merely a framework of pipes arranged like a pyramid with three landing wheels under it and an open seat within for the pilot. The autogyro blades are mounted at the top, and are controlled by levers within easy grasp of the pilot. A vertical tail extends to the rear. It weighs only 120 pounds but can carry a load of 300 pounds.

This revolutionary glider was developed at the General Electric Flight Test Center. It is called the G.E. Gyro-Glider. In use, it is towed aloft by a plane and released from various altitudes like a standard glider. It descends with less speed than a parachute. This is due to the rotation of the nine-foot blades caused to revolve by the air pressure as it descends. It can land on a small spot, and land so gently that its cargo is uninjured.

In tests the Gyro-Glider was put in the air by being towed behind a jeep. It rose 100 feet. Its commercial application will be to reach isolated areas without adequate landing fields.

Science News Letter, November 9, 1946

NUTRITION

Sauerkraut Is Excellent Vitamin C Source

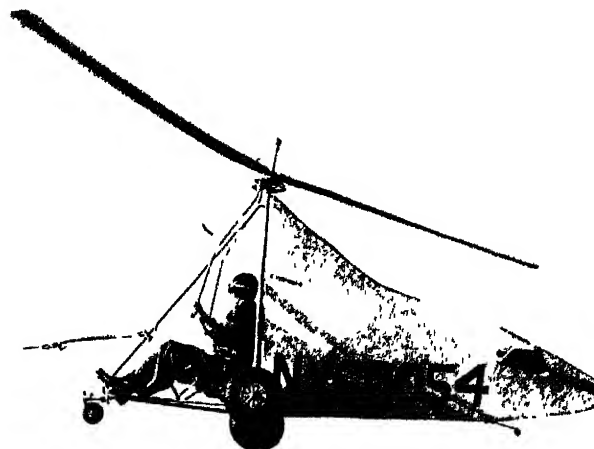
➤ FERMENTATION that takes place in the making of sauerkraut has little if any effect on the product's excellent vitamin C content, reports Dr. C. S. Pederson of the New York Agricultural Experiment Station at Geneva.

Some loss of the vitamin occurs during storage of kraut, according to his findings, but in an examination of 226 cans of kraut the majority showed a vitamin C content that topped the average for tomato juice.

His experiments also show that kraut may be "fortified" with vitamin C by adding crystalline ascorbic acid in the preheating tank or by adding uniform-sized tablets of ascorbic acid to the containers before filling.

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One problem in the atomic bomb project was to make pure fluorine.



POWERLESS CRAFT—This Gyroglider, without wings or engine, developed by General Electric, is being towed by a jeep.

MEDICINE

Plague Is Still a Menace

Modern medicine and living conditions have reduced death from plague, and urban communities need fear little from it.

➤ PLAGUE, while virtually conquered by modern communities, still looms on the medical horizon as a grim threat in any major disaster to civilization.

This is indicated by Dr. Karl F. Meyer, noted University of California bacteriologist, who says that while the mortal Black Death of the middle ages appears to be as virulent and more widespread than at any time in history, its harvest of death has been cut to a negligible point by modern civilization.

Obstacles placed in the path of plague, outside certain parts of Asia, include good housing, sanitation, quarantine, and supervision of the infectious sick. More recently new weapons of modern medicine have been added, including the sulfa drugs and streptomycin, with the promise that epidemics may be halted almost before they start.

Dr. Meyer says that laboratory experiments at the University of California and elsewhere and reports from India on the use of sulfadiazine indicate that the rate of fatality among persons who have contracted the disease can be cut to a small percentage. The laboratory research also indicates that the dosing of healthy persons exposed to plague reduces the possibility of their contracting the disease to a small percentage. Preliminary studies with streptomycin

indicate this anti-biotic may be even more effective an agent against plague.

Dr. Meyer says that the disappearance of plague from Western Europe after the London epidemic of 1666 with its 70,000 deaths is still a mystery, but it gave science an opportunity to grow up and mobilize weapons against it.

The disease appeared in epidemic form again in 1894, at Hongkong, and quickly spread all over the world, concentrating in particular areas. When it appeared in China the plague bacillus was quickly isolated and identified and serums were developed against it. Perhaps even more important, its mode of transmission was determined; it is carried by rats in cities and by squirrels and mice in field and forest, and the bacillus is spread among these and to man by flea bites.

Dr. Meyer warns that vigilance must not be relaxed against plague, in spite of the potent defenses against it. Rodent control and flea eradication, the latter with the aid of DDT, must continue.

Urban communities need fear little from plague today, but a constant source of potential outbreaks in rural areas lies in wild rodents. Reservoirs of plague from this source exist in 14 states west of the Mississippi.

Science News Letter, November 9, 1946

TELEVISION

New Color Television

Electronic television, now successfully established in principle, awaits manufacture of transmitters and stations before available to the public.

➤ COLOR television by an all-electronic means is now a fact. It is a complete departure from television in mechanical color which has been shown in various forms during the past few years.

It uses a color-slide television camera, developed by the Radio Corporation of America, which produces signals from 35-millimeter Kodachrome slides. Transmission of the picture on the slide is achieved in natural colors when a light beam from a kinescope is focused through the slide and separated into component colors by a system of mirrors and photo-electric cells.

Each of the three transmitted images, red, blue and green, is of the same number of lines, 525; also the same horizontal scanning rate and the same picture repetition rate of 30 pictures a second as in present commercial television broadcasting.

The receiving set has three kinescopes, which separately receive the signals representing the three colors. From them the three color images are optically projected into a bright composite picture

which appears on a 15-by-20-inch screen in natural color.

Broadcasts from color stations using this electronic simultaneous system can be received clearly on present black-and-white receivers by the addition of an easily installed radio-frequency converter, RCA officials state. No modifications are required inside the set. The pictures will be received in black-and-white, however, not in color. It means that these black-and-white receivers are usable even if broadcasting stations transmit only the ultra-high frequencies of electronic color television.

It will take several years to establish electronic color television as a service to the public. The present equipment is experimental, but establishes the principle. Time will elapse before production of commercial transmitters and receivers can begin. Then broadcasting stations will have to be provided. The new RCA electronic color television system will be made available to the entire radio industry, David Sarnoff, president of the corporation, states.

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"TRINOSCOPE" — Heart of the RCA television receiver has three simple projection lenses through which images in red, blue and green appearing on three kinescopes beneath the lenses are projected in natural color on the screen at the top and front of the cabinet.

ENTOMOLOGY

Body Temperature of Grasshoppers Taken

See Front Cover

➤ TAKING A grasshopper's temperature may save thousands of dollars in the farmers' war against the pests.

Profs. J. H. Pepper and E. H. Hastings of Montana State College use a delicate electrical instrument, 5/1000 of an inch in diameter, to take a grasshopper's temperature as a part of a study of when and where the insects eat. A victim is pictured on the cover of this SCIENCE NEWS LETTER. This information will aid in locating poison bait where it will be most effective against the hoppers.

The scientists believe that a grasshopper's feeding habits depend on a relationship between the intensity of sunlight, the temperature of the air and the insect's body temperature. Experiments and studies of the effects of sunlight and air temperature were relatively simple, but a special thermo-couple had to be devised to get the body temperature of the grasshoppers. The device developed by General Electric engineers can be inserted into the grasshopper without damaging the specimen and minimizes the sources of error.

Science News Letter, November 9, 1946

MEDICINE

Don't Overuse Nose Drops

➤ WITH THE WORST season for colds and sinus trouble approaching, many persons need to be reminded of the danger of abusing, or over-using, nose drops. Physicians call these drops nasal vasoconstrictors. The continued use of them is drug addiction, Dr. Clifford F. Lake of the Mayo Clinic declares.

Briefly, here is what happens. Nose drops, or nasal vasoconstrictors, relieve the stuffy, congested nose and let you breathe more comfortably by shrinking, or constricting, the blood vessels in the lining of the nose. If this constriction is a severe and prolonged one, as it can become from frequent, continued use of the nose drops, the process goes into reverse. The blood vessels are dilated and you can get a worse stuffiness and congestion than before.

At this point, the ignorant user of nose drops uses them more often and

perhaps even changes to a stronger kind. Soon, like the typical patient described by Dr. Lake, the nose gets into such a condition that it is necessary to put drops in every two or three hours. The victim of this nose drop addiction begins to feel he cannot get along without the drops, that he will be unable to breathe and sleep, and some even say that they will die.

If you get into this state, you should see a doctor without delay. He will doubtless advise you to stop the nose drops but he may give you something to help you sleep the first few nights because at first your nose will be stuffier than ever after stopping the nose drops. By the end of a week you should be breathing quite freely without them, unless there is some mechanical obstruction, which the doctor will search for.

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AERONAUTICS

Internal Cooling Liquid Adds Take-Off Power

➤ **MORE TAKE-OFF** power and a greater load for planes is possible with the use of an internal cooling liquid in the engine, wartime research of the National Advisory Committee for Aeronautics disclosed. The discovery was made public with the release from military security of a report on research conducted by Addison M. Rothrock at the Aircraft Engine Research Laboratory, Cleveland.

Ammonium hydroxide was the liquid coolant inducted through the inlet manifold of the plane's engine. Its use permits 25% more take-off from the fuel. This means an approximate usable increase of 8.5% in the take-off load and increases the plane's rate of climb.

The increase in load is equivalent to an increase in the weight of gasoline carried of between 30% and 65%.

Water used alone as the cooling agent might freeze in cold weather or at high altitudes, so ammonia was mixed with the water to lower the freezing point. Mr. Rothrock says that other coolants may be used depending on availability and ease of handling as well as engine performance.

Science News Letter, November 9, 1946

PSYCHIATRY

1930 Depression Caused Mental Illness Today

➤ **MENTAL CRACK-UPS** today are not necessarily due to the stresses of the atomic age. They may be caused in many cases by the depression of the 1930's, in the opinion of Dr. Robert Felix, mental hygiene chief of the U. S. Public Health Service.

Children of the depression had their emotional make-ups warped by the frustrations and stresses of that experience. They developed faulty patterns of living which make them unable to meet the strains of present day life. Men and women who were young adults at the time of the depression and cracked then but somehow kept going are now on the down grade because they have reached the middle years of life when early emotional stresses often take their toll.

Better mental health for prosperity or depression if it comes again can be achieved through the National Mental Health Act. By this mandate from Congress we are to have mental health

clinics, personnel to staff them and a public educated to use them at first attack of butterflies in the stomach or any other sign of beginning mental illness.

Training not only of more psychiatrists, but of general practitioners, nurses, social workers, clergymen, lawyers and teachers in the mental health aspects of their work is another aim of the program as Dr. Felix outlined it to the Women's National Press Club.

Given a few years in which to get the program well under way, Dr. Felix thinks we can get through another "recession" without havoc to the mental health of the population. But if the recession comes soon, Dr. Felix said he would "sit in a cell and pray" because there would be nothing else he could do with the present pitifully small handful of clinics and personnel to handle the load of mental illness such an experience would bring.

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BACTERIOLOGY

Germs Won't Get Resistant To All Antibiotic Remedies

➤ **FEAR** that penicillin, streptomycin and other antibiotic remedies will sooner or later become useless is somewhat allayed by studies carried on in the laboratories of Ohio State University.

As germs get used to penicillin through repeated contacts in the patient's body, they grow resistant to it. But if the test-tube studies reported in the journal *Science* (Oct. 25) are verified in living animals, doctors can switch from penicillin to other antibiotics, or the reverse, and cure the patient in spite of the germs' resistance.

In the research, resistant strains of two bacterial species, the boil-causing *Staphylococcus aureus* and the colon bacillus, *Escherichia coli*, were built up by exposing successive sub-cultures to increasing concentrations of each of the three drugs, penicillin, streptomycin and streptothricin. Then each kind was exposed to various concentrations of the two compounds not included in its "ancestral conditioning." With only a single exception, all of the resistant strains proved non-resistant to both of the other drugs to which they had never had a chance to become accustomed.

The research was carried on by a team consisting of Miss Marguerite Sullivan, Prof. Grant L. Stahly, Prof. Jorgen M. Birkeland and Dr. William G. Myers.

Science News Letter, November 9, 1946

IN SCIENCE

RADIO

FM Sets Will Be Made For General Public

➤ **BECAUSE** the Federal Communications Commission has decided to make no further changes in the wavelengths assigned to FM (frequency modulation) radio broadcasting, watch for these developments:

Manufacturers will start making FM sets for the general public.

Radio broadcasters will build and erect transmitters.

Until the freezing of the FM frequencies, manufacturers were afraid to start manufacturing and broadcasters were not sure what kind of stations to build.

FM broadcasting differs from the standard kind mainly because it operates on very high frequency portions of the radio spectrum. The principal advantages of these frequencies is that they are practically static-free. The range of FM stations is the same day and night, but the range is limited under ordinary conditions to about 100 miles.

Frequency modulation was developed before the war. There are now over 60 FM broadcasting stations, and nearly 600 more have been authorized by the FCC. The band now assigned by the FCC to FM broadcasting is from 88 to 108 megacycles.

Science News Letter, November 9, 1946

GEOPHYSICS

War Helped, Retarded Knowledge in Geophysics

➤ **WAR GREATLY** speeded the development of certain branches of the science of geophysics, but hampered others, Dr. James B. Macelwane, S. J., of St. Louis University, told the meeting of the National Academy of Sciences. Greatly increased facilities for weather forecasting were needed for military purposes, and meteorology was pushed into correspondingly accelerated development. On the other hand, knowledge of earthquakes and their causes had little immediate practical value, so that seismological reporting and research was perforce neglected.

Science News Letter, November 9, 1946

E FIELDS

NUCLEAR PHYSICS

Double Weight Neutron Believed to Exist

► THE EXISTENCE of a double weight neutron, twice the mass of the neutron that sets off the atomic bomb, is suggested in a report to the American Physical Society by two University of Texas physicists, M. Y. Colby and R. N. Little, Jr.

Not yet discovered, the heavy neutron might result from the action of double weight hydrogen upon triple weight hydrogen. This reaction has not yet been tried because tritium, as triple weight hydrogen is called, is just now becoming available in sufficient quantities. Double weight hydrogen is called deuterium, and it is the hydrogen that heavy water is made from.

Discovery of the dineutron would result in the possibility of obtaining new and important knowledge of the binding energies that hold the nuclei of atoms together. This would be of extreme importance in all further advances in nuclear or atomic energy.

Science News Letter, November 9, 1946

ASTRONOMY

Astronomers Continue International Cooperation

► WHILE MILITARISTS were setting the stage for World War II, scientists in their respective countries carried on the tradition of international cooperation. And now that the shooting has stopped, they have resumed their interrupted programs and initiated new ones. Prof. Harlow Shapley, director of Harvard College Observatory and president of Science Service, told the meeting of the National Academy of Sciences.

As a concrete example, he pointed to the work of astronomers of 24 countries, with Germany, Japan and Italy very prominent on the list, in making precision observations on the erratic asteroid Eros during the prewar decade. Calculations based on their data, completed in 1941 by the Astronomer Royal in London, determined the distance from earth to sun with a new degree of precision.

As an example of the new international cooperation, Dr. Shapley men-

tioned the action of authorities in Eire and Northern Ireland, who have joined with Harvard to set up a telescope of new and unique type on a kopje in South Africa. Harvard now collaborates in astronomical work in the Netherlands, Denmark, Mexico, Eire, Northern Ireland, the USSR, and on the Cape of Good Hope. The Harvard Observatory staff itself is a highly international body, with scientists from 15 nations at work; three more nationalities have to be added when the over-all payroll is considered.

Future international cooperation is already under way along several lines. All American astronomical observatories are working together to restore the astronomical libraries in Poland, which were totally destroyed during the war. The International Astronomical Union, badly disrupted during hostilities, is being reconstituted. The United Nations Educational Scientific and Cultural Organization is being urged to replace with a great international observatory all ruined and damaged European observatories.

Science News Letter, November 9, 1946

MEDICINE

Two Types of Common Cold Follow Exposure to Germs

► DISCOVERY that there are at least two types of the common cold, just as there are two or more types of influenza, is announced by Dr. John H. Dingle and associates of Western Reserve University School of Medicine.

One kind starts in the nose, developing 24 to 48 hours after exposure. The other begins with a sore throat five to seven days after exposure.

Hope of a vaccine to protect against colds seems limited at present to the sore throat kind. The conscientious objectors who volunteered as human guinea pigs for the studies developed immunity to the sore throat virus after having this kind of a cold. But they "caught cold" again when inoculated with the virus of the nose cold after a previous attack of nose cold. Having one kind of cold did not build up immunity, or resistance, to the other kind.

Dr. Dingle's studies were made at Fort Bragg, N. C., while he and Drs. Charles H. Rammelkamp, Jr., George F. Badger, Alto F. Feller and Richard C. Hodges, were members of the Army's Commission on Acute Respiratory Diseases.

Science News Letter, November 9, 1946

OPTICS

Molding Process Makes Optical Lenses in Bulk

► SMALL OPTICAL lenses of eyeglass size can now be produced in quantity, as finished articles without grinding and polishing, by a molding process which is carried out in an atmosphere of hydrogen.

The products of the new method, while satisfactory for many uses, do not have the optical quality of high precision polished lenses. An improved press, however, is expected to yield a product accurate enough for some telescope systems. The present lenses produced by this method are less than two inches in diameter.

The process was developed by scientists of the Eastman Kodak Company, and a report has been prepared by them which has become available from the Office of Technical Services, U. S. Department of Commerce.

Before this method was discovered it had not been possible to mold suitable lenses which were free from defect due to the uneven chilling of the hot slug of glass on contact with the mold.

Science News Letter, November 9, 1946

PHYSIOLOGY

Electric Thermometer Measures Blood in Vessels

► BLOOD temperatures may now be measured directly in the blood-stream itself by means of a new electric thermometer, announced by the Office of Technical Services, Department of Commerce.

The minute sensitive part of the apparatus, known as a thermistor, is embedded in a glass bead only one twenty-fifth of an inch in diameter. This in turn is encased in the tip of a rubber tube so slender that it can be pushed through a hollow needle inserted into a blood vessel.

From the thermistor a pair of slender wires lead back to a small box containing apparatus for measuring changes in electrical resistance. From these changes, the blood temperature can be determined within a range from 97 to 133 degrees Fahrenheit.

The new blood thermometer was developed during the war by William G. Fastie and Louis F. Drummer, Jr., under a contract with the Chemical Warfare Service.

Science News Letter, November 9, 1946

MEDICINE

Bankruptcy For Blood Banks

The war emergency is over, but people still need blood. Although plasma is still used, nothing takes the place of whole blood.

By JANE STAFFORD

➤ LITTLE more than a year ago millions of Americans were proud and eager to give their blood to the Red Cross, that some wounded soldier might have a chance to live.

Today, now that the killing and the wounding of war has ceased, there is a shortage of human blood needed for the serious casualties and accidents of peacetime—and to continue to help wounded veterans in their long-continued fight toward health.

Doctors are worried over the shortage that the public does not know about—a shortage that should be easier to do something about than the shortages of meat, nylon, fats, clothes, houses and cars.

There have been reconversion difficulties in the supplying of the vital red fluid that can save a life. During the war it was on a national scale. Now it is a matter to be handled locally to a large extent, with each community on its own.

Low Blood Deposits

And the deposits in the blood "banks" in most hospitals and community health centers are dangerously low—not because people are callous or unwilling, but because they do not realize that "working capital" is just as necessary to a blood bank as money on deposit to a financial bank.

If you had walked into the community blood bank of the Nation's Capital a few weeks ago, you would have seen a single solitary bottle of whole blood on deposit there in its refrigerator. There should have been 20 bottles of various types, which any banker would agree would not be an excessive working capital even if each bottle were worth a thousand times more than the \$40 or so that is the cost of a bottle of human blood.

If a score or two of the champion blood donors of the war days volunteered for peacetime service, a blood banking system for each locality in the nation

could be "financed" and accident crises that are likely to come to any area would be sure to be met.

The peace needs for blood are somewhat different from war's demands. Whole blood, not plasma, is needed now. And the quantities are far smaller.

There is not a shortage of plasma, the fluid part of the blood. At the end of the war, the Red Cross had more than a million bottles of this material. This surplus plasma was made available to the public through health departments or approved medical organizations or institutions. Blood banks, even when running low on whole blood, are likely to have plasma on hand. This is because after the whole blood has become too old to use, the plasma can be drawn off and kept, either in liquid form, or frozen and dried.

Plasma is an extremely valuable material for treating certain conditions, such as shock from severe burns or wounds.



VOLUNTEER—A few have not forgotten that the Red Cross is still collecting vitally needed blood. Blood banks for civilians are running dangerously low.

When large amounts of blood are lost, however, nothing takes the place of whole blood. That is why, toward the end of the war, the Red Cross began supplying the Army and Navy with whole blood as well as with blood plasma and albumin. This would have been done earlier if a method had been discovered sooner for keeping the whole blood fresh from the time it was collected until it could be flown to Army and Navy surgeons treating the wounded overseas.

Hemoglobin Important

Whole blood is red. Its color comes from the chemical hemoglobin, which transports oxygen to all parts of the body. When oxygen is lacking, death follows. Breathing air containing oxygen into the lungs is not enough. The oxygen must get from the lungs to all parts of the body. It does this via the hemoglobin in the red cells of whole blood.

When a healthy person loses the hemoglobin and red cells contained in one pint of blood, he can quickly rebuild more red cells and hemoglobin from food. Within eight weeks or less the deficit is made up. A severely wounded or injured person who has lost more than a pint of blood cannot do this fast enough. He needs fresh supplies of whole blood to tide him over until his body can start rebuilding plentiful supplies of hemoglobin and red cells on its own.

Lack of Blood

Supplies of whole blood for patients dying of hemorrhage were obtained until shortly before the war from donors called on when the emergency arose.

No one knows how many men, women and children died because a donor could not be found in time. Devoted relatives and friends would answer the call to give a pint of blood, only to find to their grief that their blood was useless. It did not belong to the same group as the patient's blood. Injecting it into the patient's veins would kill him instead of saving him.

To meet these calamities, hospitals kept and still list professional donors. These were men, and occasionally women, in the community whose blood had been grouped and tested for absence of disease germs. When a patient with group A blood needed blood, group A

donors on the list were called. This often involved fatal delays.

Blood Typed

First, the patient's blood must be typed. Then the donor list consulted. Then the phone calls made. One, two, three or maybe all of the donors of the right blood group may be out. When one is reached, he may just have finished dinner, or a bed-time or party snack. If this is the case, he cannot give blood because if he has eaten within the past five hours, his blood may contain substances that would harm the patient. When a suitable donor is finally located, there is further delay while he gets to the hospital.

This procedure may take two or three hours. If the blood is needed in the middle of the night, as so often happens in cases of automobile accidents, or homicidal or suicidal attempts, delay in getting a donor may be even greater.

Contrast that with the following report from a large eastern hospital:

At 1:30 a.m. a 17-year-old expectant mother arrived at the accident room after a 35-mile trip by ambulance. She had a deathly pallor, her pulse could scarcely be detected. Death seemed a matter of minutes.

No time was lost in waiting for results of the test to show what her blood group was, or to type the blood of the young husband who had come with her. A bottle of group O blood, called "universal donor" blood because it is usually safe for persons of all groups, was swiftly brought from the hospital blood bank.

Immediate Transfusion

At 1:40, within 10 minutes of her arrival, she was given a transfusion. With the blood still running into her veins, she was taken to the operating room. There, without interruption, she was given two more pints of blood while the surgeon was operating. By that time her blood had been typed. It was group A and the hospital bank had plenty of A blood on deposit. The following morning, because her blood was still very low in hemoglobin, she was given another pint of group A blood from the bank.

The most heroic efforts, under the old conditions, could not have provided this quantity of blood soon enough. Fortunately for this young girl, the hospital's blood bank was not bankrupt. It takes many donors, volunteer or paid, to keep blood banks solvent.



BLOOD NEEDED—Blood for transfusions is needed for many of the 90,000 wounded still in Army hospitals such as this man at Walter Reed hospital.

Source of Donors

Relatives and friends of patients who get transfusions are one possible source of blood supplies for the banks. At the hospital where this patient had her transfusions, her hospital bill may have had a charge for four pints of blood—to be paid in blood. At this particular hospital, no patient, private or ward, can buy blood from the bank for cash. They may pay a professional donor for blood for the bank, or they have relatives and friends come in to give blood.

At some hospitals, there is a charge of \$40 for each pint of blood from the bank. If the patient protests he cannot pay this charge, he is told that for each pint of blood repaid to the bank, \$10 will be taken off his bill. Hospitals may themselves buy blood from professional donors and store it in their banks, charging the patients as the blood is withdrawn. This makes the blood costly. The hospital usually pays \$25 a pint to its professional donors.

In addition, there may be a \$10 charge to the patient to cover the typing and testing of the blood. In a good many hospitals there is also a \$5 or \$10 charge for what is called the "transfusion set." This includes the apparatus and the services of the intern who watches the patient afterwards, going in every hour or so to check on a possible bad reaction to the transfusion.

Some cities have community blood banks for all hospitals to draw on. Ideal-

ly, the hospital would send to the bank a relative or friend of the patient's to give a bottle of blood for each bottle withdrawn. In practice, this does not work out. Once the emergency is over, doctors, friends and relatives seem to lose their enthusiasm. So the bank is obliged to charge for the blood. The price is \$25 per bottle.

Refund for Blood

If a patient's relative does give a pint of blood to the bank, the patient is refunded \$15. If a second pint is given, the bank refunds \$10. This bank is a non-profit organization and gives blood free to those unable to pay, if the doctor in charge signs a statement that he has not charged a fee.

A Transfusion Credit slip is issued to anyone who donates blood for himself. In that way, a man can build up a balance in the blood bank, to be drawn on in case of need by himself, a relative or a friend.

Denver, Miami, New York City, Washington and Cincinnati have community blood banks. In Seattle, a prominent philanthropist raised \$250,000 among a few citizens to start a community bank, then launched a community campaign for funds for maintenance and future upkeep.

Scientific research during two wars made possible blood banks and new uses of human blood to fight death and disease. In World War I, Dr. E. H. Robertson of the U. S. Army set up

Do You Know?

Most *scientists* are for open research openly published.

Wrought iron *beams* were used to reinforce many of the Greek temples built 2,500 years ago, it is said.

Approximately 90% of the *fires* that destroy millions of American property each year are preventable.

Calcium chloride on a gravel road, one engineer states, "Keeps the road together, keeps dust down, and keeps people satisfied."

Four *chemical plants* are to be constructed in Egypt at a cost of approximately \$8,000,000 to produce chemicals for the Middle East; an order for the plants has been placed in America.

Certain papers in which a special *resin* is included as an ingredient are strong even when wet and are particularly suitable for wrapping meats and other foods in food lockers.

Sulfuric acid has been produced for over 1,000 years, it is said; this basic chemical, which plays an important role in American industries, is now made in the United States in an amount approximating 10,000,000 tons each year.



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From Page 299

blood banks to help the wounded. Blood was donated by healthy or recovered soldiers at the rear, dextrose was added to preserve it, and it was kept in refrigerators until it could be sent up to the front.

Midway between the two wars, the Russian scientist, Dr. S. S. Yudin, began experimenting with freshly drawn cadaver blood which he preserved for transfusions. Results were good and thousands of transfusions of this kind were given. The blood has to be drawn within six hours after death from healthy persons who die suddenly. American doctors realized there would not be a sufficient supply of such blood in this country to meet the demand.

First Blood Bank

The idea of obtaining blood donations from friends and relatives of patients and storing it for future transfusions was developed by the late Dr. Bernard Fantus at Cook County Hospital in Chicago. The first living donor blood bank in the world was established at this hospital in 1937.

A brief three years later came news of still another advance in blood transfusions. This was the development of methods for drying plasma, the liquid part of the blood, so that it could be kept safely for months and years, instead of a week or 10 days, and could be transported easily, compared to the difficulties of transporting whole blood.

Millions of bottles of dried plasma, from blood donated to the Red Cross, were shipped overseas for the war wounded. This vital stuff, however, still took considerable space, and shipping space was at a premium during the war.

From scientific laboratories again came a solution to the problem in the form of blood albumin, a more concentrated and therefore space-saving fraction of the blood. Pioneer of this development was Dr. Edward J. Cohn of Harvard.

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Basically, the idea is very simple. It consists in putting alongside the exhaust pipe a long reflected or parabolic cross-section, its focus directed towards an infra-red-transmitting glass window in the side of the fuselage. Back of this window, the heat rays strike a black painted duct which is part of the plane's air-circulating system. Shutters facilitate control.

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Eighteen years ago, when Monsanto developed the first Aroclor, it was just a curiosity in a chemical laboratory. Today, the Aroclors comprise a series of more than 25 chemical compounds, serving scores of industries in hundreds of profitable applications.

Aroclors are heavier than water... possess great adhesiveness, especially on smooth surfaces... have remarkable penetrating power... are water repellent and flame resistant. Their ability to withstand extreme pressure is unusual... some have exceptional lubricating power... all possess interesting electrical characteristics.

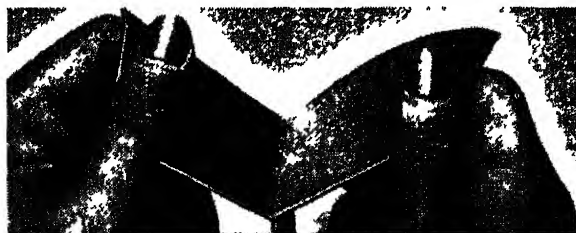
Pictured here are just a few of the ways Aroclors are being used by many manufacturers. As you study these applications, we hope you will ask yourself: "How can the Aroclors benefit me?" Then, we'd like the opportunity to help you find the answer.

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*Reg. U. S. Pat. Off.

HERE ARE JUST A FEW OF
THE INDUSTRIAL APPLICATIONS
OF MONSANTO AROCLORS:



Adhesive Coatings... Aroclors give great smooth-surface adhesiveness to pressure-sensitive industrial tapes.



Flame Resistance... Combined with other materials, Aroclors impart flame resistance to cloth, paper, wood.



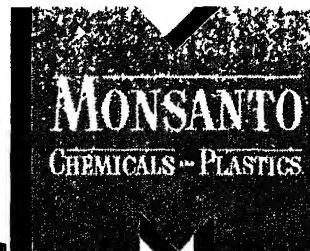
Moisture Proofing... Used with waxes, oils, resins, to produce moisture-resisting impregnating compounds.



Rubber... Rubber Substitutes... Milled into rubber, Aroclors impart permanent tackiness and adhesion.

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SERVING INDUSTRY...WHICH SERVES MANKIND

Do You Know?

Most *scientists* are for open research openly published.

Wrought iron *beams* were used to reinforce many of the Greek temples built 2,500 years ago, it is said.

Approximately 90% of the *fires* that destroy millions of American property each year are preventable.

Calcium chloride on a gravel road, one engineer states, "Keeps the road together, keeps dust down, and keeps people satisfied."

Four *chemical plants* are to be constructed in Egypt at a cost of approximately \$8,000,000 to produce chemicals for the Middle East; an order for the plants has been placed in America.

Certain papers in which a special *resin* is included as an ingredient are strong even when wet and are particularly suitable for wrapping meats and other foods in food lockers.

Sulfuric acid has been produced for over 1,000 years, it is said; this basic chemical, which plays an important role in American industries, is now made in the United States in an amount approximating 10,000,000 tons each year.



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From Page 299

blood banks to help the wounded. Blood was donated by healthy or recovered soldiers at the rear, dextrose was added to preserve it, and it was kept in refrigerators until it could be sent up to the front.

Midway between the two wars, the Russian scientist, Dr. S. S. Yudin, began experimenting with freshly drawn cadaver blood which he preserved for transfusions. Results were good and thousands of transfusions of this kind were given. The blood has to be drawn within six hours after death from healthy persons who die suddenly. American doctors realized there would not be a sufficient supply of such blood in this country to meet the demand.

First Blood Bank

The idea of obtaining blood donations from friends and relatives of patients and storing it for future transfusions was developed by the late Dr. Bernard Fantus at Cook County Hospital in Chicago. The first living donor blood bank in the world was established at this hospital in 1937.

A brief three years later came news of still another advance in blood transfusions. This was the development of methods for drying plasma, the liquid part of the blood, so that it could be kept safely for months and years, instead of a week or 10 days, and could be transported easily, compared to the difficulties of transporting whole blood.

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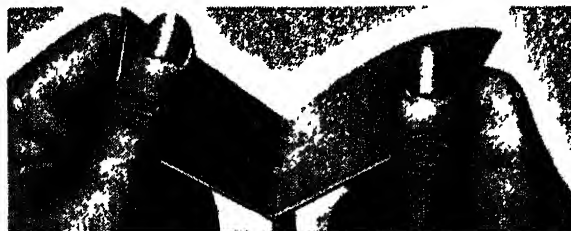
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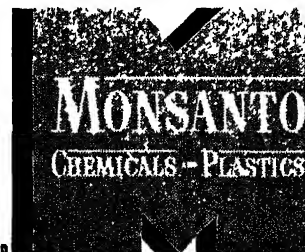


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ORNITHOLOGY

Trumpeter Swan Increases In Population During Year

► THE TRUMPETER swan, believed to be an extinct species only 40 years ago, added a 60 to its comeback score during the past year. A census taken jointly by the U. S. Fish and Wildlife Service and the U. S. National Park Service shows a total of 361 birds, as compared with 301 in 1945.

Most of the known nesting sites are concentrated on the Red Rock Lakes Refuge in Montana and in one valley in the northeastern part of Yellowstone National Park. The remaining population is scattered over adjacent areas in the Northwest.

The trumpeter swan, a magnificent bird with an eight-foot wingspread, was once fairly abundant. But reckless killing for their breast skins and down during the latter part of the nineteenth century, combined with drainage and cultivation of their nesting areas, practically wiped the species out.

In 1907, a few survivors of the supposedly extinct species were discovered, and the long, slow job of helping the birds to survive was begun. Even in 1935, however, the annual August census showed only 73 birds, and the upward trend of the curve has been notched with occasional setbacks after unfavorable seasons.

Science News Letter, November 9, 1946

YOUR HAIR

AND ITS CARE

By O. L. Levin, M. D. and H. T. Behrman, M. D.

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If you want healthy hair, lovely hair, then you need the expert advice in this book

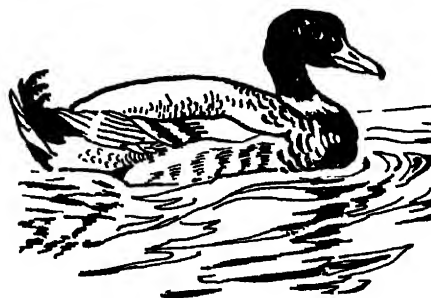
Two medical specialists have here pooled their knowledge to give you in plain language the up-to-date scientific facts now available about hair. They tell you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, common and uncommon, as.

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Roads in the Sky

► WILDFOWL have been migrating southward steadily for several weeks, and there are still some flocks to go. It is the time of year when men who like to do a day's shooting, in season, find it hard to stick to their jobs.

When the birds fly south in autumn, and again in spring when they return to their nesting grounds in the North, they do not just fly in the general direction they want to go. They have certain great migration routes, as well defined as the routes followed by commercial airlines, and they stick to them season after season. Not improbably these great flyways, as they are called, originated at the close of the Ice Age, 20,000 or 30,000 years ago.

The U. S. Fish and Wildlife Service, together with the corresponding government agencies in Canada and Mexico, have been making flyway studies for years, employing every known means for keeping track of the migrating waterfowl. Airplanes are the latest facilities for migration studies that have been placed at the disposal of these scientists of the out-of-doors.

There are four main flyways, it has been found: one along either coast, one down the Mississippi River and one along the High Plains, just east of the Rockies. A subsidiary flyway down the Great Basin area should perhaps be considered really a part of the latter. Each flyway is able to provide what the migrating birds need: landmarks visible in dim light, water areas not too far apart, for resting purposes, and opportunities to forage for food.

Since North America is a roughly triangular area, with the narrow end at the

south, there is a convergence or funneling effect on all these flyways. Ducks that fly down the Atlantic coast, winter in Florida and the West Indies, for example, converge from nesting grounds as far west as the MacKenzie river basin and as far east as the southern tip of Greenland. Other ducks from as far west as Bering strait and as far east as Baffin land use the Mississippi flyway and winter along the Gulf coast. Similar funnelings take place in the northern parts of the other two flyways, though their eastern boundaries are not quite so far east. Birds following these two flyways winter farthest south, spreading over most of Mexico and Central America and into the northern part of South America.

There is thus a good deal of overlapping, both in areas of origin and in wintering grounds. Yet the birds seem to be able to sort themselves out when they go home in the spring.

Science News Letter, November 9, 1946

OPTICS

Aluminum Surfaces Make Better Mirrors

► BETTER MIRRORS, with aluminum, reflecting surfaces, are made by a simple evaporation method explained to the Optical Society of America by Noel W. Scott of the Radiation Engineering Branch of the Army Engineering Board, Fort Belvoir, Va.

Aluminum is used as the reflecting material because evaporated aluminum films have a high reflectivity in all useful spectral ranges. The method will have its principal application in making mirrors for scientific instruments.

The fine grained smooth surface is important for the deposition of effective protective coatings on the mirror and for minimizing diffuse reflection. As protection for the mirror surfaces silicon oxide layers are used.

Science News Letter, November 9, 1946

Books

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Books of the Week

AIRPORTS. Design, Construction and Management—Horace Glidden, Hervey Law, and John Cowles—*McGraw-Hill*, 583 p., illus., diags., tables and graphs, \$7. Here is a book covering all aspects of airport design, construction, and management, to give the student a sound, accurate knowledge of each of the component parts of an airport, the requirements and factors involved in its location and design, and the basic principles underlying its functional operation and management.

BLUE ANGELS AND WHALES—Robert Gibbins—*Dutton*, 153 p., illus., \$3. This book is an enchanting excursion in warmer and exotic waters near Bermuda. The author describes and illustrates fish that swim on their heads, and others that swim backwards, with false-faces to complete the illusion. Every nook of coral architecture seems to have its amazing inhabitant, armed with some cunning trick that enables it to survive.

EDUCATION: America's Magic—Raymond M. Hughes and William H. Lancelot—*Iowa State College Press*, 189 p., maps and tables, \$2.50. A book that discusses the progress and problems of universal education in the 48 states

ENCYCLOPEDIA OF PSYCHOLOGY—Edited by Philip L. Harriman and written by many contributors—*Philosophical Library*, 897 p., illus., tables, charts, and graphs, \$10. This volume presents to the student, as well as to the intelligent layman, an up-to-date and complete survey of all the major issues and concepts in the field of psychology.

GOATS AND KIDS—*Encyclopaedia Britannica Press*, 40 p., illus., 50 cents. The extraordinary shots in this book not only reveal the unusual life of the goats, but tell in full page photos of the adventures of two kids who continue to escape from their pen. *Encyclopaedia Britannica True Nature Series*, Book 9.

GUGGENHEIM MEMORIAL FOUNDATION: 1943 and 1944 Reports of the Secretary and of the Treasurer—*Guggenheim Memorial Foundation*, 384 p. An impressive record of the work of a great institution in providing through fellowship for the future intellectual and artistic leadership of mankind.

KAPUTT—Curzio Malaparte—*Dutton*, 407 p., \$3.75. The story is a remarkable panorama of the moral and physical disintegration of modern Europe. All phases of life in a decadent society under the impact of Nazi domination are vividly illuminated.

MEN AGAINST CRIME—John J. Floherty—*Lippincott*, 255 p., illus., \$2.50. This book contains a brief history of the development of the Treasury Department, as the country developed. There is a special chapter on qualifications for the secret services in many branches and one on the lie detector and its use.

METALLURGY—Carl G. Johnson—*American Technical Society*, 418 p., illus., diags., and charts, \$5. This textbook presents in a simple manner some of the available

knowledge concerning the manufacture and behavior of the many metals and alloys in use in our modern civilization

THE OPERCULATE LAND MOLLUSKS OF THE FAMILY ANNULARIIDAE OF THE ISLAND OF HISPANIOLA AND THE BAHAMA ARCHIPELAGO—Paul Bartsch—*U. S. Printing Office*, 264 p., tables and plates, 75 cents. *U S National Museum Bulletin* 192.

PRAIRIE WINGS: Pen and Camera Flight Studies—Edgar M. Queeny with explana-

tory sketches by Richard E. Bishop—*Ducks Unlimited, Inc.*, 256 p., diags. and illus., \$15.

THEIR MOTHER'S SONS—Edward Strecker, M.D.—*Lippincott*, 220 p., \$2.75. This is a book about Mother, the great American "Mom" and what she is doing to the young men of America. In its pages a psychiatrist describes a new American tragedy—the millions of young men in this country today who live in confusion and emotional chaos condemned by millions of well-meaning and unthinking "Moms" who will not cut the apron strings between them and their sons

Science News Letter, November 9, 1946



SPINOZA

Portrait of a Spiritual Hero

By RUDOLF KAYSER

Preface by

ALBERT EINSTEIN

THIS is more than the true life story of one of the world's greatest philosophers. It is also a history of Europe's political upheaval of the 17th Century and an Odyssey of the Jews of Spain and Portugal.

Born in Holland in 1632 of Portuguese Jewish parentage, Spinoza's eventful life was a constant struggle and search for intellectual freedom and honesty. In the background is the great drama of war-torn Europe and the fall of the Dutch Republic, the "little America" of the 17th Century, which offered the fleeing Jews an asylum.

"A book that is much needed in our time. It will bring comfort and gladness to its readers and will inspire them to a new belief in mankind. Spinoza for me was always a great source of inspiration and this book gives me a vivid picture of this great figure in Israel."—Sholem Asch. \$3.75

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•New Machines And Gadgets•

☼ **PHONE** silencer, for voice privacy, office quiet and improved phone hearing, utilizes a novel acoustical arrangement which directs the important tones directly into the transmitter and absorbs other tones in a special chamber. This absorption chamber is filled with fiber glass.

Science News Letter, November 9, 1946

☼ **FIRE ALARM** system is designed to prevent false alarms. The informer breaks the glass of the box and presses a button. A voice from the fire station immediately asks where the fire is. A trick question or two often traps a person if giving a false alarm.

Science News Letter, November 9, 1946

☼ **MAGNET**, for recovering tools dropped in deep water, or guns and knives hidden from police in rivers and harbors, is made of disks of magnetic alnico alloy separated by slightly larger steel pole pieces. No batteries are required. In its ordinary assembly, it can pick up a weight of 300 pounds.

Science News Letter, November 9, 1946

☼ **FATHOMETER**, for small fishing and pleasure boats, employs the same echo-sounding principle used in Navy and commercial vessels. The entire system consists of an easily installed control unit, projectors and a power supply. It gives accurate depth measurements up to 400 feet.

Science News Letter, November 9, 1946



☼ **SHIPPING** container, refrigerated, has a magnesium cooling unit inside that is operated by gases emanating from dry ice. The box itself, shown in the picture, weighs 20 pounds empty and has an outer wall of vulcanized rubber and a lining of aluminum, with a light insulating material between them.

Science News Letter, November 9, 1946

☼ **PORTABLE DARKROOM**, for developing photographs, is a complete prefabricated unit with stainless steel sink and worktable. It can be assembled by one man in six hours. Sponge rubber is used to give tight wall joints, and the

hinged roof, which when open completely covers the walls, contains the electric wiring.

Science News Letter, November 9, 1946

☼ **SELF-WRINGING** mop with a sponge head of synthetic rubber makes housework easier. The highly absorbent oblong-shaped mop is pushed over the floor with little effort. It is fitted on a metal bracket with rods running through lengthwise. A knob at one end, when pulled, squeezes the water out.

Science News Letter, November 9, 1946

☼ **OBSERVATION** cars, with narrow upper decks covered with glass roofs and sidings, are now on the rails. The observation seats, over the center aisle of the car, are reached by stairways from the ordinary floor.

Science News Letter, November 9, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 836. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

Question Box

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ENTOMOLOGY

Why take the temperature of a grasshopper? p. 295.

MEDICINE

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What communities need fear plague and from what source? p. 294.

What disease will erythrin fight? p. 296.

Who won the Nobel Prize? p. 291.

NUTRITION

What has sauerkraut been found good for? p. 294.

ORNITHOLOGY

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What are the four great migration routes for water-fowl? p. 302.

PSYCHIATRY

What basic convention makes Germans feel like puppets? p. 298.

What past event is the cause of much mental illness today? p. 296.

TELEVISION

What is new about color television? p. 295.

Where published sources are used they are cited.

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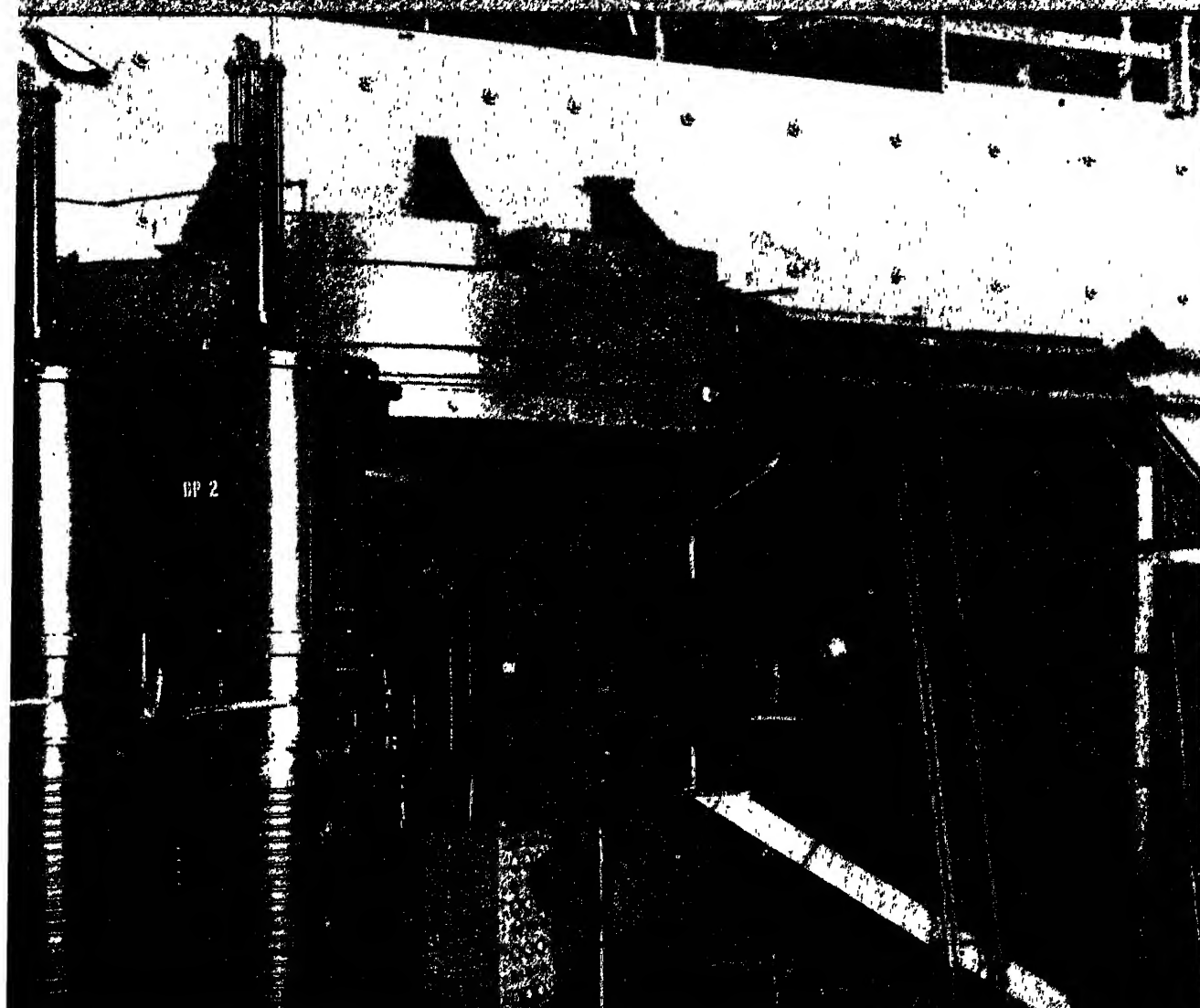
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SCIENCE NEWS LETTER

Vol. 50, No. 20

WEEKLY SUMMARY OF CURRENT SCIENCE • NOVEMBER 18, 1946



A SCIENCE SERVICE PUBLICATION

*He advanced
the bombing of
Hiroshima
by at least
a year!*

This is a "now it can be told" story of wartime research.

It started back in post World War I days when Dr. Harvey C. Rentschler, Director of Research for the Westinghouse Lamp Division, and Dr. J. W. Marden, an associate, decided to determine the melting point of a rare mineral . . . *uranium*.

In his unending search for an improved electric lamp filament, Dr. Rentschler wanted to find out if *uranium* would give better service than *tungsten*.

So Dr. Rentschler and his associates worked for about a year before they found a way to make pellets of pure uranium from which the melting point could be determined. Although uranium's melting point made it unsatisfactory for a lamp filament, Westinghouse continued to supply tiny amounts of the precious metal to colleges and research laboratories for experiments in nuclear physics.

(Little did they realize that their know-how would one day give America a head start in the race towards history's grimmest goal!)

For the most devastating war of all time had meanwhile blazed throughout the world—and scientists in many countries were feverishly trying to

discover a method for unleashing the incredible energy concealed within the atom.

Then, early in 1942, Dr. Rentschler received a telephone call. The director of the atomic experimentation project at the University of Chicago wanted to know how soon Westinghouse could supply *three tons of pure uranium!*

Dr. Rentschler and his co-workers immediately went into action. They set up a miniature uranium "factory" in the Lamp Division laboratory—ultimately increasing their production of pure uranium from 8 ounces to 500 pounds daily, cutting its cost from \$1,000 to \$22 a pound.

And within a few months, Westing-

house had supplied *more than three tons* of the vital metal to the Chicago Metallurgical Project Office . . . where the famous "atomic pile" experiments were conducted. They also supplied uranium to physicists at Princeton University who did much to the pioneering work on the atomic bomb.

. It all started as an obscure experiment to find a *better* lamp filament—like many another quest for product improvement that goes on constantly in the great Westinghouse research laboratories.

But, today, Dr. Rentschler's work of 20 years ago is given full credit for advancing America's atomic bomb activities by at least a year!



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CHEMISTRY

Penicillin Made by Man

Better penicillins even than the mold makes are expected to come from laboratories. Only a small quantity for research has been made.

► NEW AND BETTER penicillins are expected as a result of the duplication in the laboratories of this mold chemical announced by chemists of Cornell Medical College in the journal, *Science*, (Nov. 8).

The scientists who synthesized penicillin and are now at work synthesizing new penicillins are Prof. Vincent du Vigneaud and associates, Frederick H. Carpenter, Robert W. Holley, Arthur H. Livermore and Julian R. Rachele.

Chemical remedies for such still-unconquered diseases as tuberculosis, the common cold, influenza and infantile paralysis may be forthcoming, now that chemists have learned how to synthesize penicillin and to change and perhaps improve its chemical make-up. That is something the mold itself could not do.

Laboratory Product

Synthetic penicillin is still a laboratory product. The very small amount of 10 milligrams is all that has been made so far. It takes over 30,000 milligrams to make an ounce. There is no chance whatsoever of commercial production of synthetic penicillin at the present time, stated Prof. du Vigneaud. He pointed out, however, that throughout the history of chemistry it has usually been the case that if a substance can be synthesized at all, the method can be improved and commercial production becomes possible.

An unusual feature of the synthesis of penicillin is that it was done without knowing the exact architecture of the penicillin molecule. Ordinarily, chemists start with knowledge of this architecture, called a structural formula, and proceed to build up the molecule.

All during the war American and British chemists, working in the secrecy demanded by military security, tried to learn the architecture of the mold chemical that was saving battle-wounded and, later, civilian victims of deadly infections.

In the early stages, the majority of chemists working on the problem favored an oxazolone-thiazolidine struc-

ture. Scientists at Oxford University in England and at Merck and Company in the United States independently and almost simultaneously in the first months of 1944 obtained a chemical of this architecture which had anti-germ activity like penicillin's. But they had such minute amounts of material that some of the scientists collaborating on this war research thought the antibiotic activity might be due to something other than penicillin.

Structure Not Right

The architecture of the compound they were working with, it then turned out, was probably not correct for penicillin. That was the situation in January, 1946, when the OSRD contracts terminated. Up to that time, 38 groups of scientists, 17 in Britain and 21 in the United States, had been working on the problem under OSRD and British Medical Research Council auspices.

In the first few months of 1946, Prof. du Vigneaud and his associates succeeded in isolating crystalline penicillin and proving its identity with the natural product.

One of the first things they did to prove their synthetic white crystals really were penicillin was to compare their activity against seven different bacteria with that of natural penicillin. The two penicillins had the same action against the bacteria.

Synthetic Passes Test

Having passed this bacterial spectrum test, synthetic penicillin was next put through a really tough one. This was the excretion test in which the same amounts of natural and synthetic penicillins were given to rabbits and the amounts of each which the animals excreted were measured. The ratio of excreted penicillin to the dose was the same for both penicillins.

Radioactive sulfur was used in preparing another batch of synthetic penicillin. Natural penicillin was added and then isolated as a triethylammonium salt. This salt contained radioactive sulfur and

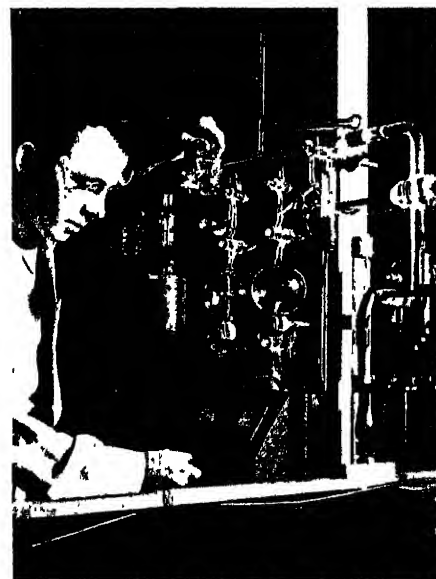
held it through two recrystallizations and through conversion to two derivatives.

When the enzyme, penicillinase, which rapidly inactivates natural penicillin was added to the synthetic, this was inactivated in the same way. Synthetic penicillin also showed the absorption band in the infrared region characteristic of natural penicillin.

Part of the battle to prove that the synthetic material actually was penicillin consisted in fractionations to "fish out the active material in higher and higher concentrations," Prof. du Vigneaud explained. His group finally succeeded in obtaining synthetic penicillin at a concentration of 270 units per milligram.

"Particularly noteworthy," he points out, is the fact that the synthetic penicillin finally obtained is the same optical isomer as natural penicillin although there could be about eight isomers of penicillin.

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MOLECULE TARGETS—Apparatus reveals by microwave the kind of gas molecules present and the behavior of their atoms. The ammonia is contained in the glass bulb on the left. It passes into the long rectangular "barrel" or waveguide which extends across the lower part of the picture. When the vibrations of the gas are "in tune" with the vibrations of the microwaves, the microwaves are absorbed and a study of the absorption can be made. Research is being done at Westinghouse laboratories.

MEDICINE

Seven Scientists Honored

► FOR THEIR PART in helping to win victory over disease and death, seven individual scientists and five groups of scientists received the Lasker Awards of the American Public Health Association at its meeting Nov 12.

Because better control of diabetes may come through his discovery of the first real clue to how insulin helps the body burn sugar, the first \$1,000 award will be given to Dr. Carl Ferdinand Cori, of Washington University School of Medicine.

Dr. John Friend Mahoney, U. S. Public Health Service senior surgeon, receives the award for his first use of penicillin to treat syphilis.

For discovery of the Rh blood factor the third award will be presented jointly to Dr. Philip Levine, of Plainfield, N. J., Dr. Alexander S. Wiener of Brooklyn, and to Ernest Landsteiner for his father, the late Dr. Karl Landsteiner.

Dr. Alfred Newton Richards, University of Pennsylvania professor of pharmacology, receives the fourth \$1,000 award for the many vital wartime medical achievements made under the OSRD committee on medical research of which he was chairman.

For his successful fight against malaria and yellow fever, Dr. Fred L. Soper of the Rockefeller Foundation's International Health Division will receive the fifth \$1,000 award.

Awards in the form of citations and Winged Victory statuettes in silver (the

individuals above receive golden statuettes in addition to the cash awards) will be made to the following: U. S. Bureau of Entomology and Plant Quarantine for its work in controlling insect borne diseases and particularly for its research on DDT. Dr. Fred C. Bishopp will accept the award for the group.

The Army Epidemiological Board which protected our men against epidemics during the war and developed an effective vaccine against influenza. Dr. Francis G. Blake, chairman and Yale Medical School dean, will accept for the group.

The National Institute of Health of the U. S. Public Health Service, for notable work during the war in the fight against dysentery, malaria and typhus and aid in protecting the health of atom bomb workers. Dr. R. E. Dyer, director, will accept the award for the group.

The Northern Regional Research Laboratory, U S Department of Agriculture, for making possible mass production of penicillin. Dr. G. E. Hilbert, present director, will accept for the group.

The Board for the Coordination of Malarial Studies, under whose auspices were developed a cure for one kind of malaria, new and better remedies for other malarias, and development of rational use of available remedies with consequent removal of malaria from the field of tactical importance to the armed forces.

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teller Foundation, which was augmented by funds from the Research Corporation, the John and Mary Markle Foundation and the University of California. Its completion is being forwarded with the assistance of the Manhattan District.

Two other types of atom-smashers are being studied. A 300,000,000-volt synchrotron is being built under the direction of Dr. Edwin M. McMillan and is scheduled to be completed early next year. Theoretically more powerful than either of the other types is the linear accelerator proposed by Dr. Luis W. Alvarez. A model of this atom smasher, believed capable of accelerations as high as billions of volts, is also under construction.

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NUCLEAR PHYSICS

Cyclotron Smashes Nuclei

See Front Cover

► FOR THE FIRST time in the world's history, a 200,000,000-electron volt beam of heavy hydrogen atomic hearts has been produced. This was the first experiment with the 4,000-ton supercyclotron, shown on the cover of this SCIENCE NEWS LETTER, just put into operation at the University of California.

Dr. Ernest Lawrence, Nobelist and cyclotron inventor, reported that the deuteron beam was used to bombard beryllium and that a sharp, intense beam of high energy neutrons resulted from the bombardment.

Engineering work by the University

of California radiation crew headed by Prof. Robert L. Thornton and William Brobeck, called "brilliant" by Dr. Lawrence, solved operating difficulties more quickly than expected.

Several months of experiments were planned with the giant instrument without major changes. Scientists predicted results more important than the previous accomplishments with cyclotrons. The atomic bomb element, plutonium, was made in a smaller cyclotron. Many entirely new nuclear reactions may result from work with the new 184-inch cyclotron.

Its construction was financed mainly by a gift of \$1,150,000 from the Rocke-

ASTRONOMY

Giant Telescope Designed

World's second largest telescope, 120-inch reflector that operates on a fork mount, has been designed. Construction will start next year.

► THE DESIGN of the world's second largest telescope, the 120-inch reflector at the University of California's Lick Observatory, is almost completed and construction will start next year.

A scale model one-sixteenth actual size has been built by the designer, W. W. Baustian, to solve in a miniature observatory the problems which will be encountered in the telescope's operation. Cost of the instrument is estimated at \$1,200,000, and construction will take at least four years.

For the first time a fork type mount will be used on a large telescope, the 53-foot tube and eight-ton, 16-inch-thick mirror of the Lick giant resting in a two-pronged 70-ton steel fork. The hollow fork can be rotated at will on its polar axis by a motor, while a second motor in the fork will drive the 35-ton tube and mirror.

With this mount the whole sky, with the exception of the area five degrees above the horizon, can be covered without the requirement of excessive space and heavy counterweights in changing the position of the tube.

Inside the 90-foot diameter dome housing the instrument, mechanized platforms and stairways will permit ready access to any part of the telescope.

Dr. C. Donald Shane, director of the Lick Observatory, said that the instrument has been designed along conserva-

tive lines in order to permit the installation of any type of auxiliary equipment usable on large telescopes. It will be possible to install the prime, Newtonian, Cassegrain and Coude focuses.

Lessons learned in the construction of the 200-inch telescope at Mount Palomar, the 100-inch mirror at Mount Wilson and other large instruments have been used to good advantage in the design. On advice of Palomar designers the mirror will be of solid disc glass, making for easier grinding and polishing and freedom from bending under its own weight than a sectioned type glass.

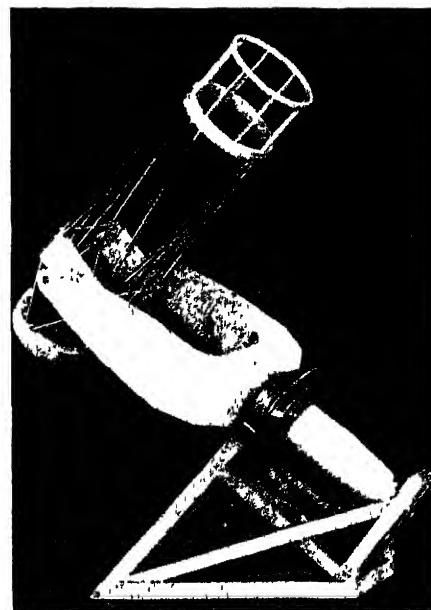
Dr. Shane said the mirror will take astronomers 900 million light years out into space, bringing within visibility fainter stars and stellar systems beyond reach of all but the Palomar telescope.

A cooperative research program will be undertaken by Lick and Palomar astronomers, in order to avoid duplication of effort with the two telescopes, Dr. Shane stated.

In addition to the more detailed study of brighter stars, the 120-inch telescope will permit investigations of remote galaxies beyond the Milky Way.

"An understanding of the motions and detailed structural features of the nearer galaxies affords the most fruitful means of understanding the structure and evolution of the universe," Dr. Shane stated.

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MODEL, NOT TOY—This model of the 120-inch reflecting telescope to be constructed at the University of California's Lick Observatory is scaled to one-sixteenth of the actual size. Figure in fork is reduced to same scale as model.

Snellen test are given the plus sphere test. Cases of nearsightedness are almost always discovered with the Snellen test, but farsightedness is only rarely uncovered by it and then only in the very severe types.

Farsightedness is a much more common defect than nearsightedness. Farsighted children are severely handicapped in their school work. Some are able to overcome the defect enough to see their lessons, but this usually causes eyestrain and headache, especially toward the end of the day. The symptoms may become so aggravated that to do near work is very uncomfortable and the child, therefore, does not like school.

About 7% of the children tested fail the plus sphere test, compared with about 17% who earned a score of 20/30 in both eyes on the Snellen test, Dr. Van der Slice reported.

The plus sphere test, he acknowledged, is open to some controversy on the amount of plus sphere in the glasses but the limits were set by a group of nationally prominent eye specialists after a two-year study in which more than 6,000 children were tested and checked against an eye specialist's examination.

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OPTICS

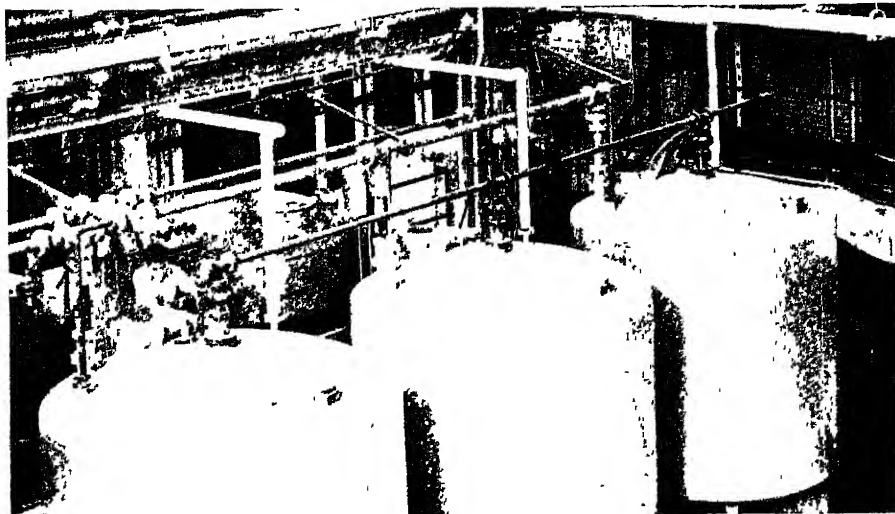
Test for Farsightedness

► FARSIGHTEDNESS, which handicaps many a school child so greatly that he hates school, can now be detected by a simple, accurate test, Dr. David Van der Slice, Flint, Mich., director of school health program, declared at the meeting of the American School Health Association.

The new test is called the Plus Sphere test. It is one of a battery of tests in the Massachusetts Vision test developed by eye specialists, educators and psychologists.

The test is made with the Snellen (symbol E) chart but with the child wearing plus sphere glasses which shorten the focal length of the reflected light rays. The child is asked to read the 20 line on the chart. If he can read it correctly, he is farsighted. The child who is not farsighted will complain that the symbols are blurred because the plus sphere glasses prevent the light rays from focusing on his retina, as they must for clear vision.

Only those who pass the ordinary



PILOT PLANT—The Northern Regional Research Laboratory of the U. S. Department of Agriculture at Peoria, Ill., tests on a semi-commercial scale new processes for making alcohol from various farm products.

SEISMOLOGY-OCEANOGRAPHY

Sea Wave Prediction

Alarmists frightened coastal dwellers in the region of a recent submarine earthquake, although seawaves cannot be forecast from earthquake data alone.

➤ **NEEDLESS** fears, and hurried abandonment of their homes by seacoast dwellers in Hawaii, were caused by "scare" reports that a big sea wave, similar to the one that drowned 140 people last April 2, was sweeping down the North Pacific from the Aleutian islands on Nov. 1, following the occurrence of a severe submarine earthquake in that region.

Destructive sea waves start from submarine earthquakes, but not every such earthquake starts a sea wave. It is therefore impossible to predict such waves simply from the occurrence of submarine quakes.

Despite the chanciness of forecasting sea waves on the basis of earthquake data alone, seismologists of the U. S. Coast and Geodetic Survey did venture a qualified prediction as soon as they saw the trace of the Aleutian disturbance on their seismograph. They said: first, there might be no wave at all; second, if a wave did reach Hawaii it would probably not be at all severe.

Somewhere along the line of transmission, this very conservative statement got blown up into major-alarm proportions. At the predicted hour, watchers on the Hawaiian coast observed a very modest rise in the ocean, but no disaster-

bearing wave such as they had been led to expect. It was very close to what the scientists in Washington had said might happen.

The seismologists, in the meantime, went ahead and made a "fix" of the epicenter, on the basis of data gathered telegraphically from nine seismological stations reporting through Science Service. The quake centered under the sea south of Atka island in the Aleutians. This is a point about 450 miles southwest of the epicenter of the disaster-causing earthquake of April 2.

It was a severe disturbance. On the Gutenberg scale of 10 for the most violent quakes, it rated 7.25. The April 2 earthquake rated 7.5, only a little more severe.

Observatories reporting were those of the California Institute of Technology, Pasadena; University of Washington, Seattle; Dominion Observatory at Ottawa; stations of the Jesuit Seismological Association at St. Louis University, Georgetown University, Xavier University in Cincinnati and Springhill College in Alabama; and the stations of the U. S. Coast and Geodetic Survey in Tucson, Ariz., and Washington, D. C.

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ENGINEERING

Plant To Produce Alcohol From Farm Waste Products

➤ **MOTOR FUELS** made synthetically from farm wastes have entered production in an experimental plant at Peoria, Ill., of the U. S. Department of Agriculture.

The plant will produce alcohol. It is the Bureau's contribution to the government's research program for producing liquid motor fuels from non-petroleum sources. Production from agricultural products was assigned to Agriculture; production from oil-bearing shale, coal and natural gas is under research by the Bureau of Mines.

The new plant will handle enough farm residues to provide fermentable material for the production of 500 gallons of alcohol daily. At capacity, it will produce 2,000 pounds of glucose in 10% solution, 1,600 pounds of hylose in 15% solution, 200 pounds of furfural, and 1,000 pounds of liquid in eight hours.

The process used in the new plant, for producing fermentable sugars from which the liquid fuels are obtained, is an outgrowth of research at the Northern Regional Research Laboratory of the Department of Agriculture by Drs. E. C. Lathrop and J. W. Dunning. The farm wastes to be used include corncobs, sugarcane bagasse, peanut shells, flax shives, and the hulls of oats, cottonseed, and rice. Grain straw and cornstalks can also be used in the process. They are the waste products that are available in fairly constant quantity each year.

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INVENTION

Hydraulic Jack to Alter Airplane Wing's Camber

➤ **THE OLD** dilemma of the camber of an airplane's wings, which should be thick for takeoff and climbing but thin for speed in flight, has challenged Jacques Fresco of Hollywood, Calif., for patent 2,410,056. His solution is a small hydraulic jack in the cavity of the wing, with ribs radiating from top and bottom to change the wing's shape as the jack is operated.

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If all the land under *irrigation* works built by the U. S. Bureau of Reclamation were lumped together, it would make an area larger than Connecticut and Rhode Island combined.

MEDICINE

Eyes Saved from Chemicals

Eyes suffering from alkali and chemical burns can be successfully healed by removing the outer layer of the cornea. Treatment helps acid burns.

► EYES BURNED by chemicals can be saved by denuding the cornea of its outer layer. This new treatment, developed during seven years of research, was announced by Dr. Ralph S. McLaughlin, consultant in industrial ophthalmology of South Charleston, W. Va., at the meeting of the Industrial Hygiene Foundation.

Treatment of complications of chemical burns of the eyes in the past has been at best make-shift and almost always unsatisfactory, Dr. McLaughlin declared.

A dye, fluorescein, is used to tell whether the denuding operation is necessary. When this is dropped in the eye a green stain appears if the cornea has been damaged.

A number of opaque spots on the transparent cornea will be seen under the bio-microscope in all cases when alkaline and injurious neutral compounds have gotten into the eye. These spots, looking like deposits of grayish-colored material, are actual collections of the chemical, Dr. Henry F. Smyth and associates of the Mellon Institute of Pittsburgh found. They give the solution to the proper treatment of the condition.

Acid burns do not show these spots but such burns heal more quickly if the denuding treatment is given.

This treatment consists in carefully

wiping the outer layer of the cornea from its attachment. It is done with a circular motion, from the center outward, using a toothpick swab. Cocaine in the eye relieves the patient of pain during the operation. At first Dr. McLaughlin removed the entire outer layer of the cornea, called the epithelium. Now he finds it is only necessary to remove such cells as have been damaged by the chemical. The bio-microscope is used to check this. The conjunctiva lining the eyelids is also carefully denuded.

The eye should be healed within 24 hours, certainly within 48 hours. If not, Dr. McLaughlin suspects complications, often from infections in teeth or tonsils. These are immediately treated or removed. In some cases ulcers on the cornea which would not heal, healed overnight when the source of the infection had been removed.

The extreme pain which follows the denuding operation is relieved by a half percent pontocain ointment. It can be used as often as necessary to keep down pain without fear of damage to the eyes.

Delay of more than six hours in getting a chemical eye burn victim to the doctor is "unforgivable," Dr. McLaughlin declared. Results will be "excellent" if he gets to the eye doctor within two hours.

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FROST DEFENSE—Machine uses infrared heat to prevent frost damage. It was developed at the Michigan State College Agricultural Experiment Station.

dered harmless by a unit such as the new infrared oil heater.

Electrical units have been experimented with, but they proved to be too expensive to be practical. The oil heater will only be useful where the crop has a high value per each acre.

Tests are continuing with the heater to increase its efficiency and coverage.

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ENGINEERING

Progressive Chilling Separates Wax from Oil

► WAX is one thing refiners usually want to get out of oil. In a new process, on which patent 2,410,483 was granted to E. M. Dons and O. G. Mauro of Tulsa, this is accomplished by progressive chilling. The wax-containing oil is first heated, then chilled de-waxing solvent is injected into the hot oil stream.

This causes the formation of a cloud of minute wax crystals. Additional increments of de-waxing solvent are injected at progressively lower temperatures, which causes rapid growth of the crystals. Finally they are removed by filtering.

Rights in the patent are assigned to the Mid-Continent Petroleum Corporation.

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AGRICULTURE

Heat Rays To Save Crop

► INFRARED HEAT rays from an oil-burning heater developed at the Michigan State College agricultural experiment station may save farmers some of the millions of dollars lost each year from late spring and early fall frosts.

The experimental burner developed can keep the temperature over one acre eight degrees warmer than outside temperatures at a cost of 75 cents per hour. This is expected to prove most useful protecting the high-cost-per-acre crops such as fruits, berries, truck gardens and flowers.

Infrared heat warms the plants directly without warming the air, a large economy of heat.

Cost of the experimental model was \$250, but engineers believe that a burner large enough to protect one acre can be produced for one-third to one-half that figure.

Frost damage, which in Michigan alone runs as high as \$20,000,000 some years, is generally caused in a few hours by only a slight dip in the temperature. These early fall or late spring temperature tumbles could generally be ren-

ASTRONOMY

New Telescope Has Only One Eyepiece

➤ FROM THE Netherlands, where Galileo got his idea for that first revolutionary telescope of his, comes something radical in telescope design. It was developed by Albert Bouwers of Eindhoven, who has been granted patent 2,409,186.

Most large telescopes are accompanied by instruments of much smaller power, used as finders. When the observer has spotted his star, he shifts from the eyepiece of the finder to that of the main instrument—sometimes an inconvenient process.

To permit the same eyepiece to be used for both objectives, the Bouwers design interposes a small, movable mirror at a slight angle, about midway of the tube. This throws the small objective out of action, and catches light sent from the big lens through a train of mirrors in the other tube, including one large, concave mirror at its base, in which most of the light-focussing is accomplished.

Because this patent was processed while the Netherlands lay in the hands of the Nazis, rights in it are vested in the Alien Property Custodian.

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ICHTHYOLOGY

Male Fish Incubates Eggs By Carrying in His Mouth

➤ A MALE FISH that incubates the eggs by carrying them in his mouth is one of the latest oddities in the 28,600 specimens brought to the U. S. National Museum collections by American scientists surveying the fish and game resources of the Central American Republic of Guatemala.

Dr. Robert R. Miller of the Smithsonian Institution, who directed the fish survey, reports the egg-hatching male, a curious fresh-water catfish, not only incubates the young in his mouth but probably occasionally cradles the young there. From time to time baby fish return to the father's mouth for shelter after they are hatched, Dr. Miller believes.

During all this time, the male "mother" does not eat.

Other odd species from lowland Lake Yzabal include a fresh-water shark and a fresh-water sawfish, both groups generally being found in salt water. These

may prove to be hitherto unknown.

Another fish-story specimen discovered in the Guatemalan lake is a night-prowling "bare-eyed" fish, the gymnotus. It's an eel-like creature with hardly any eyes which hides by day and ventures forth only at night.

The introduction of good game fish in the upland lakes of the country is a major aim of the survey, conducted jointly by the Smithsonian Institution, the U. S. Fish and Wildlife Service and the State Department.

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NUCLEAR PHYSICS

Energy Must Be Used, Not Outlawed to Waste

➤ ATOMIC BOMBS can not be outlawed, the Society of Automotive Engineers was told by Dr. H. B. Hass of Purdue University, Indiana. At the same time, he urged nations to use the new atomic energy constructively for peacetime purposes.

Military history shows no example of the successful outlawry of any such really effective weapon, he declared. Never before was it more effectively demonstrated that science is power: power to do good or evil. The problem now is to develop peacetime uses for the new energy, and persuade people to want to use it for good.

Whether atomic energy can be harnessed for constructive peacetime use is only a matter of time. The whole history of science shows that every new form of energy discovered has been successfully harnessed.

While the United States may keep the secret of the atomic bomb's manufacture for a few years, this scientist of the Manhattan District project added, in the near future any nation which wants to spend the necessary research can have atomic bombs.

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CHEMISTRY

Sugar Fermentation By Yeast Yields Glycerin

➤ GLYCERIN is produced from sugar by fermentation with ordinary yeasts by Dr. Carl A. Neuberg, New York City, and Irene S. Roberts of Fieldston, N. Y., for patent 2,410,518. Secret is two-fold: very heavy inoculation with yeast culture, and maintenance of relatively high acidity during fermentation.

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IN SCIENCE

CHEMISTRY

Unique Plastic Makes Excellent Insulator

➤ A UNIQUE plastic with unusual electrical properties was described at the meeting of the Society of the Plastic Industry by E. B. Yelton of the Du Pont Company. Its trade name is "Teflon." It is unharmed by temperatures up to 575 degrees Fahrenheit, he said, and withstands every known solvent.

It is an excellent insulating material for the ultra-high frequencies required by radar and television, having extremely low dielectric loss even at frequencies up to 3,000 megacycles. It does not dissipate the electric power as do most organic insulators when subjected to high-frequency currents. It is an excellent material at extreme low temperatures, and may be flexed without cracking at 150 degrees below zero Fahrenheit.

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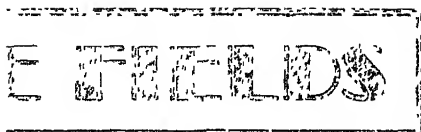
MEDICINE

Benadryl Sleepiness May Cause Accidents

➤ BENADRYL, new hayfever drug, makes some patients so sleepy that they may have accidents when driving automobiles or operating moving equipment and machinery, Drs. Benjamin J. Slater and Nathan Francis of the Eastman Kodak Company warn in the *Journal of the American Medical Association* (Sept 28).

An accident in which benadryl sleepiness may have played a part is reported by them. The patient was told to take the benadryl at 4 a. m. because that was the time when his hayfever bothered him most. However, he did not take it until 7 a. m. on the day of the accident. He started work at 8 a. m., feeling drowsy. An hour later, he lost control of an electric platform cargo truck he was driving. Fortunately, he jumped off in time and was not hurt. The vehicle went off the platform and was wrecked. While there is no specific evidence that the sleepiness from the benadryl caused the accident, the doctors suggest it may have played a part.

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CHEMISTRY

Plastic Industry Faces Shortage of Chemicals

➤ PLASTICS may be made of raw materials abundant in nature, the popular belief, but plastics making requires vast quantities of basic chemicals some of which are now in short supply. The plastics industry is dependent on these chemicals.

The shortage is already reflected in the output of the plastics industry, Frank H. Carman, of the Plastics Materials Manufacturers Association, told the Society of the Plastics Industry. He cited strikes in the coal, steel and chemical industries as one cause of a severe curtailment in the supply of many basic materials.

Among the chemicals now short, or facing an early shortage, are phenol, which is now exceedingly tight, cresols and cresylic acids, phthalic anhydride, urea, formaldehyde and glycerine. The shortage of glycerine is due primarily to the international shortage of fats and oils and the absence of a normally large supply of copra from the South Pacific.

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INVENTION

"George" Can Sleep, Too, In New Pullman Car

➤ AT LONG LAST, poor "George" gets a break. The Pullman porter is to be given a place of his own to sleep in.

For decades, the porter has had to take his sleep where he could find it. Usually, after putting all the sleepy passengers to bed, shining their shoes, and waiting for the bull session in the men's smoking compartment to break up, he has stretched his weary frame on the not-too-soft long seat in that room and snoozed as well as he could for a few hours.

A new design for a sleeping-car, on which U. S. patent 2,410,173 has been issued to L. A. Lutherman and E. L. Thompson of Chicago, changes all this. The car is of the newer type, compartmented like European railway coaches, with three-decker berths crosswise instead of parallel to the sides.

The porter's sleeping space is the up-

per berth in the compartment next to the washroom. It is, however, solidly partitioned off from the rest of the compartment, giving its occupant complete privacy, and it is entered by means of a couple of ladderlike steps on the washroom side of the bulkhead. It has exactly the same kind of mattress and bedding as the passengers' berths, and is fitted with its own private ventilator.

Science News Letter, November 16, 1946

PSYCHIATRY

Overwork Is Symptom Of Mental Sickness

➤ OVERWORK is often a symptom of mental sickness, Dr. Thomas A. C. Rennie, Cornell Medical College psychiatrist, warned at the meeting of the Nation Committee for Mental Hygiene.

Contrary to popular ideas, overwork rarely causes the kind of mental sickness called neurosis.

The patient with overwork for a symptom probably goes to his doctor because he has indigestion or headaches or his heart bothers him. The doctor needs to do more than examine his heart and digestive system. He should take a careful history of the patient, seeking particularly for signs of dissatisfaction, conflict or anxiety in daily life.

From 40% to 60% of all patients need sympathetic understanding of their emotional problems for their cure. Once the doctor has satisfied himself that the patient's physical symptoms are due to emotional disturbance, he can tell the patient with authority that giving up emotional symptoms will effect a physical cure.

Science News Letter, November 16, 1946

INVENTION

New Bullet Starts Slowly, Speeds Up

➤ A BULLET or shell that starts slowly and then speeds up is the unique invention of J. D. Evans, Jr., of Washington, D. C., formerly a major in the Army. From the base of the missile a shank projects backward through a gas-tight collar. This permits the powder pressure to act only on the end of the shank until the projectile has moved forward enough to clear the collar and give the powder gases access to its full base, thus speeding it up. Rights in this patent, No. 2,410,435, are granted royalty-free to the government.

Science News Letter, November 16, 1946

PHYSICS

Calorimeter Measures Power of Microwaves

➤ THE TEMPERATURE rise of water through which high frequency radio waves are passed measures the power of microwaves in a new accurate instrument.

It is an important invention with the increasing use of very high frequency radiation in airplane approach-control, television, radar, and frequency modulation (FM) broadcasting. The instrument is called a water calorimeter. It is a development of the Polytechnic Institute of Brooklyn.

The research preceding the development was a government-sponsored project at electronic laboratories. Several instruments were invented but only this one proved accurate enough for the exacting demands of design engineers.

This will enable engineers to improve the design of high frequency equipment for specific distances because it accurately measures the power of the radiation. The heat rise in the water depends directly upon the power of the waves. The instrument also will insure the safety of equipment used in radar.

Science News Letter, November 16, 1946

ENTOMOLOGY

Pests Threaten Ban On Incoming Flowers

➤ INSECT PESTS riding as stowaways on orchids, gardenias and tropical fruits entering the United States by air may necessitate new and stringent regulations of this traffic, with an embargo on some of the most glamorous and desirable items. Hearings to determine what measures shall be taken have been scheduled by the U. S. Department of Agriculture for Dec. 5 and 6.

One of the most feared pests, that may find its way into the country in a fragrant and innocent-looking box of gardenias from south of the Rio Grande, is the citrus black fly. Other feared insects that might travel by air include various species of aphids, thrips, scale insects and seed-pod weevils.

Sweeping exclusion of all foreign flowers will not be necessary, in the view of Department officials. Cut tulips and other bulb flowers from the Netherlands, for example, have no known potentialities of harm.

Science News Letter, November 16, 1946

NAVIGATION

Ships Turn Like Crabs

Rotating propellers, to replace clumsy screw type, maneuver ships in less space through crowded waters and enable vessels to dock without tugs.

By BARBARA M. HALL

➤ A NOVEL kind of ship that can turn in its own length and move crab-like backward and sidewise is churning up a lot of interest in marine engineering circles. "Cycloidal" is the name of the new propeller that makes this possible. It consists of blades that look something like the agitator in your mother's washing machine.

Captains of the new rudderless ships can maneuver them into a crowded docking space the way a harassed motorist often dreams he could slide his car into a tight parking space.

It has taken a long time for cycloidal propulsion to arouse the interest of American marine engineers and men of the sea. Shortly after the first World War, Dr. Frederick Kirsten, professor of aeronautical engineering at the University of Washington, invented this radical change in the method of propelling ships through the water. Dr. Kirsten, holder of some 75 patents, was known as a designer of electric power stations, fluorescent tubing, electric moth killers, wind tunnels and pipes.

Tried on Speedboat

Commercial marine men were not interested in the new propeller, so Dr. Kirsten installed a series of rotating blades on his own 38-foot speed boat. If nationwide publicity had been given the success of the cycloidal propeller at that time, the old type screw propeller might not have guided U. S. warships in World War II. Raced against screw-propelled speed boats of identical horsepower, Dr. Kirsten's boat passed each craft with amazing maneuverability.

While Americans smoked Dr. Kirsten's pipe and benefited from his lighting and research corporations, it took the Germans to grasp his cycloidal propeller and put it to wartime use. Adopted and perfected by the Voith Schneider Company in Austria, rotating propellers soon appeared on many small river and harbor craft in Europe.

Unlike the cumbersome screw propellers, cycloidal blades are assembled

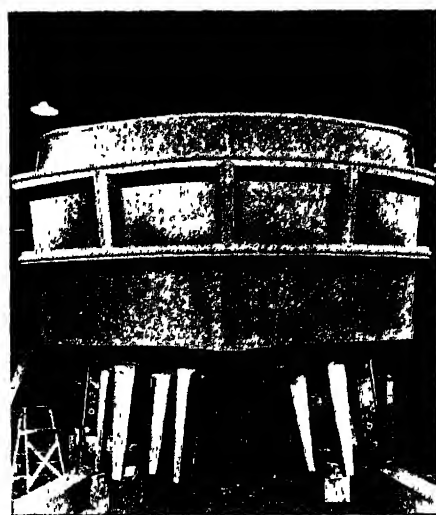
and fitted into a well built into the underwater part of the stern. No rudder and complex stern construction are needed, for the control of the propeller is all tied into a central control stand in the ship's main engine room. Movement of this control lever one way or the other can reverse the ship without changing the engine throttle. To insure that the mechanisms within the propeller hub which is under water at all times remain dry, a special type of rubber gasket seal is used where each blade is joined to the hub.

Blades Are Narrow

Unlike the huge, fan-shaped screw propeller of most vessels, cycloidal blades are narrow and hang from the hub, like knives ready to dig into the water.

With cycloidal propellers, a captain can turn his ship on a dime or stop the craft in its tracks by changing the angle at which the blades turn. Mounted vertically on the rim of a horizontal disc, four or more blades, moved in a 360-degree circle, scull the vessel ahead. The entire disc is revolved by gearing driven by propulsion engines.

Here is the point at which the Amer-



TUBBY—Cycloidal propellers dip into water like washing machine blades.

ican and German ideas parted company. The Kirsten "fixed pitch" propeller, like the conventional screw propeller, requires a clutch and engine speed control to alter the motion of the ship.

The German "variable pitch" propeller also turns the ship by varying the pitch of the blades with one important addition: the angle of the pitch can be changed in any direction without slowing down the engines. No clutch is needed to turn the ship at any speed, yet the cycloidal propeller gives an effect similar to that of the clutch on your car.

More complicated and more expensive to build, the Voith Schneider propeller is now being perfected in the research laboratories of the Army Transportation Corps. Plans and sample wheels of the superior German model, captured from a Voith Schneider plant under shell fire in Heidenheim, Germany, during World War II, have supplied most of the technical information needed to develop the propeller in this country. The Germans had already installed cycloidal propellers on at least 100 fast minesweepers, two aircraft carriers, three catapult ships for sea planes, and four huge self-propelled cranes.

Propeller Passes Test

At IJmuiden, Holland, a diesel-powered 135-foot German mine-sweeper, equipped with twin variable pitch propellers, was turned over to the Army Transportation Corps. When no deck space for the small captured ship could be found on American-bound freighters, the Army decided to take it across the Atlantic under its own power, even though the mine-sweeper was designed for coastwise service and not for long range cruising.

This was a lucky decision for the future of cycloidal propulsion, for the Voith Schneider propellers proved their seaworthiness under such severe weather conditions that the captain wrote in the log afterward: "without cycloidal propellers the craft certainly would not have survived the rough sea." Her arrival at historic Fort Monroe, Virginia, late in November, 1945, marked a significant event for U. S. marine engineering: the first successful ocean crossing by a rudderless craft equipped with rotating variable pitch propellers.

More than twenty years after his invention, Dr. Kirsten is back in the cy-

cloidal picture. While the Army combed Germany for variable pitch propellers, the Navy constructed two fixed pitch cycloidal propellers, with the aid of Dr. Kirsten.

Strange actions of the Navy landing ship 458 in recent tests of the fixed pitch model at Puget Sound finally aroused the interest of shipbuilders. During the test the LSM 458 saved a powerful tug from disaster when wind and tide conditions in Puget Sound were at their worst. Had the craft been equipped with screw propellers instead of the cycloidals, maneuvering limitations would have left both ships high and dry on the beach.

Superiority Proved

Once again cycloidal propellers proved superior to screw installations—this time for the Army. An Army 46-foot tug, equipped with a 110 horsepower gas engine and cycloidal propellers, in a tug of war with a 165 horsepower diesel tug, actually pulled the opposing ship backwards—even when handicapped by the conventional ship's head start.

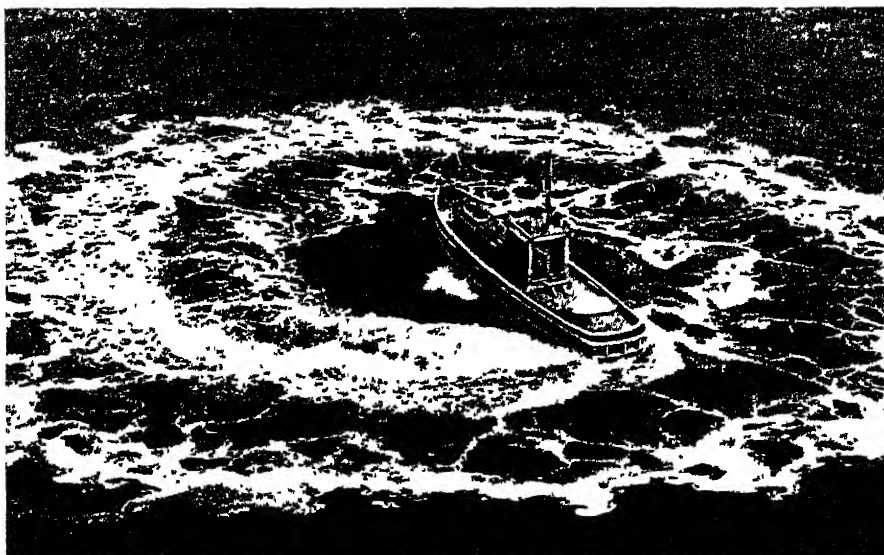
In an attempt to duplicate the advantage of the German wheel at less cost and in a design more suitable for mass production in this country, the Army, with the aid of Dr. Kirsten, is installing variable pitch propellers on a 125-foot experimental mine planter. Tests have not yet been run on the mine planter, but by the time it is ready, the Army plans to have completed three or four additional cycloidal designs better than the German model.

Inland waters, crowded with harbor tugs, floating cranes, river towboats, buoy tenders, landing craft, and fishing boats, will see fewer traffic jams once cycloidal propellers take over. It won't be long before small craft, equipped with rotating blades, will move freely in and out of docks.

Cycloidal propellers for the largest—perhaps atomic powered—ships may be farther in the future. So far only smaller craft have been built for experimental tests. But to Dr. Kirsten and the many marine men who have adopted his invention, cycloidal propulsion is not to be limited to river and harbor boats.

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Canadian *birds*, that winter in the United States, eat the dark, gritty-looking fruits of the sumac and the pallid, gray-white berries of poison ivy; by digesting the pulp and not the seeds of these plants, the birds spread the seed far and wide.



CRABLIKE—Navy landing ship, equipped with rotating propellers, turns in its tracks.

GENERAL SCIENCE

Boys See Aircraft Shows

➤ TWO HUNDRED teen-age boys aiming for careers in science, especially aeronautics, from Detroit, Columbus, Cincinnati, Buffalo, Indianapolis and Cleveland are guests of the Navy at the National Aircraft Shows in Cleveland Nov. 15-24.

Each day for five days 20 boys, Navy Science Cruisers, will be flown by the Navy from their home cities to join their 20 fellow Cruiser-hosts in Cleveland. The 40 boys will be special guests of the Navy at the National Aircraft Shows and on a guided tour through the Cleveland laboratories of the National Advisory Committee for Aeronautics, seldom seen by the public. The visitors to Cleveland will be returned to their home cities by Navy planes at the end of the day of science sightseeing.

The 200 boys have been nominated as Cruisers for excellence in science as indicated by their school records and their science accomplishments. Many of them plan careers in aeronautics and scientific research. All of them are juniors and seniors in high school.

"The Navy is making a contribution to stimulating science among secondary school students," explained Vice Adm. Harold G. Bowen of the Navy's Office of Naval Research.

"We are concerned with increasing the number and improving the quality of scientists in this country. Scientific re-

search and development has reached a point in our lives where to ignore it or even be casual about it would be folly of the highest order."

This is the second Navy Science Cruiser program. (See SNL, Oct. 19, 1946.)

Science News Letter, November 16, 1946

ASTRONOMY

Eleventh Magnitude Comet Is Spotted in Columba

➤ A FAINT comet has been located in the southern constellation of Columba, the dove. When spotted on Nov. 1, it was of the eleventh magnitude, far too faint to be seen with the naked eye or binoculars, according to a cablegram received at Harvard Observatory from Dr. J. S. Paraskevopoulos, superintendent of Harvard's Southern Astronomical Station.

Located by M. J. Bester of Bloemfontain, South Africa, the comet will be named after its discoverer. Mr. Bester also spotted a faint comet early in October, but this was later identified as the recurrent Comet Temple 2.

The new comet had moved into the constellation of Caelum, the graving tool, when sighted on Nov. 5 by Dr. G. Van Biesbroeck of the Yerkes and McDonald Observatories of the Universities of Chicago and Texas.

Science News Letter, November 16, 1946

Do You Know?

MEDICINE

Oxygen Utilization Aided

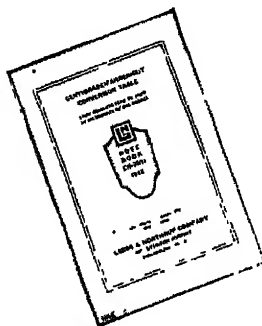
Before the war, 85% of the world's *cloves* came from Zanzibar and Pemba, two islands off the coast of East Africa.

The southern states had 15 times as many forest *fires* last year as any of the other four national regions.

The softening agent used on the hair in one "cold wave" treatment is *thioglycolic acid*; this produces as a by-product hydrogen sulfide, a poisonous gas.

A 400% increase in consumption of citrus fruit and a 30% decrease in potatoes and grain products reflect striking changes in Americans' *diet* during the last 37 years.

Corrosion causes greater loss of money than fire and flood together; as much as 40% of all iron and steel fabricated is used for replacements for parts which have become corroded.



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1, EN-33 (1)

Cytochrome C, protein found in all living tissue, promotes the use of oxygen in the body, relieving heart disease and hardening of the arteries.

➤ A LIVING TISSUE chemical given by injection promises new relief for sufferers from painful heart disease and perhaps for hardening of the arteries.

It may rescue some from mental disorders due to oxygen lack. Called cytochrome C, the new chemical treatment is reported by Drs. Samuel Proger and D. Dekaneas of Tufts Medical College and the Pratt Diagnostic Hospital of Boston in the journal *Science*, (Oct. 25).

Patients have been helped already. Angina pectoris has been relieved. Some unable to make more than a few steps because of excruciating pain in the legs, due to a condition known as intermittent claudication, have walked without pain.

The treatment consists of injections of cytochrome C. This is a protein normally present in the body and in fact in all living tissue, plant or animal. It is not poisonous so can be safely used, perhaps even in quite large single doses. Its nor-

mal function is to promote utilization of oxygen by body tissues.

This is the reason for its effectiveness in probably a wide variety of serious diseases. Lack of oxygen in the cells of blood vessels and various other body tissues is the common underlying cause of many disorders, from the black-outs of pilots during the war to angina pectoris, certain mental disorders and poisoning from overdoses of barbiturate sleeping medicines.

In conditions of oxygen lack, even so severe that the patient is barely conscious, the Boston doctors point out there is considerable oxygen circulating in the blood in the veins. A way to help the tissues use this oxygen, they reasoned, might save the patient.

Giving cytochrome C seems to be the way. An increase of oxygen consumption of 50% to 100% can be achieved with the aid of this chemical, they found in test tube experiments.

Science News Letter, November 16, 1946

AERONAUTICS

VHF Beams Guide Planes

➤ AIRPLANE beacons that flash in the night are on their way out.

Invisible, static-free very high frequency (VHF) radio beams are to take over the task of guiding transport planes over the skyways. VHF radio beams will be useful in cloudy and foggy weather as well as at night to properly equipped planes.

The impending betterment in radio ranges was made known to the Institute of Aeronautical Sciences by T. P. Wright, U. S. Administrator of Civil Aeronautics. The very high frequency ranges are being installed to replace low frequency beams widely used on the radio ranges. These will make the lights unnecessary when all planes are equipped with proper receivers.

Radio ranges and lights are still the backbone of the 40,000 miles of federal airways. The lights are still important for private planes not yet equipped for radio beam receiving.

Nine complete airways are being equipped with four-course aural visual ranges in a high frequency band. One has been in successful use since early last spring, and others are nearing completion. They are substantially free from static.

The new VHF transmitters will be stationed along airways at intervals of about 100 miles. The type being installed, called omni-directional, shoots signals in all directions. The present low frequency signals are shot only in four directions.

Loran, a low frequency navigation system for surface vessels and planes developed during the war, is the current standard for long range overseas operations. It will also serve over deserts and jungles where it is not possible to build the many VHF range sites required.

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ENGINEERING

Piped Hot Water Melts Snow, Ice from Roads

➤ WINTER'S coming, and at least one roadway is ready to face the snow and ice that block or slow traffic. A 600-foot-long road has hot-water pipes embedded in the concrete to keep it clear.

The two-lane roadway between the plant of the American Cyanamid Co. and a main thoroughfare has a constant upgrade from the plant. Snow and ice can make this virtually impassable, so the hot-water melting system has been installed in preparation for winter.

Eight black wrought-iron pipes have been embedded in the road's eight-inch concrete, providing two pipes 18 inches apart beneath each wheel track. Through these 600-foot pipes will run approximately 50 gallons of water per minute at an average temperature of 165 degrees Fahrenheit when snow or ice threaten to form on the road.

This system can remove one inch of snow or one-tenth of an inch of ice in an hour under maximum operating conditions. A greater snowfall than one inch in an hour is considered unusual, and a system designed for greater melting power is believed impractical.

Science News Letter, November 16, 1946

INVENTION

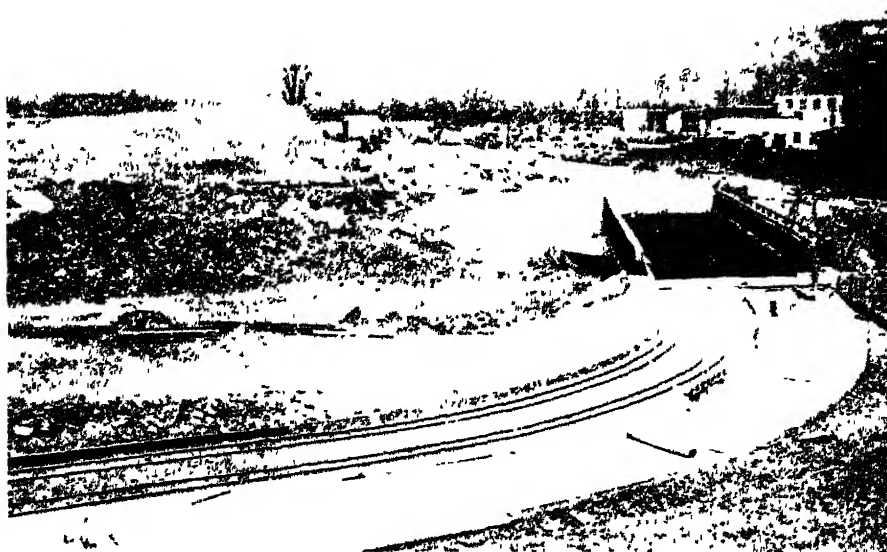
Household Ice Cubes Made Commercially

➤ ICE CUBES, household size, can be made commercially in quantities by a machine recently patented. It is relatively simple, inexpensive and durable, and the cubes when frozen slide out automatically.

A rotating drum, within which the refrigerants are placed, has a considerable number of separated ice cube molds projecting inward. In rotating they pass through outside water for freezing and pick up a little water in each revolution. Within the drum is a chamber holding freon, and between this chamber and the drum brine is placed. The freon cools the brine and the brine freezes the water. The cubes in the molds are built up as the drum revolves. Adding a little warm brine loosens the cubes, and they drop out of a special chute.

The inventor, who received patent 2,403,406 on this machine, is Arthur D. Smith, Canton, Ohio. It is assigned to Barium Steel Corporation of Canton.

Science News Letter, November 16, 1946



ROAD HEATER—Hot water flowing through pipes buried in the concrete will keep this driveway of the American Cyanamid Co. free from ice and snow.

MEDICINE

Preventing Heart Trouble

➤ HOPE THAT doctors may be able to forestall attacks of acute coronary thrombosis, a form of heart trouble, by continuous use of the drug, dicumarol, appears in a report by Drs. E. Sterling Nichol and David W. Fassett of Miami at the meeting of the Southern Medical Association.

One man who had three heart attacks within 13 months has been free of them and active in his business for the past 32 months during which he has been getting doses of dicumarol. Another patient who had three attacks within 17 months was free of further attacks for 21 months. Then he had a fourth and fatal attack. A blood test just before he died indicated he probably had grown careless about taking the medicine. Three other patients who had had multiple attacks of coronary thrombosis have been getting dicumarol for six months and have been free of attacks during this time.

The small number of patients and the fact that some persons with coronary thrombosis may go a number of years without attacks make it impossible to draw conclusions about the value of this prophylactic use of dicumarol, the Miami doctors point out. They believe the results justify further trial.

Coronary thrombosis is a condition in which a clot forms in a branch of the coronary artery supplying blood to the

heart. Depending on the size, number and location of such clots, the heart may be deprived of blood and oxygen to such an extent that it cannot go on pumping blood through the body.

Dicumarol, first discovered in spoiled sweet clover which sickened cattle, is an anti-clotting agent. It is safe to use if careful tests are made frequently to be sure the blood has not lost too much clotting ability. Otherwise there might be danger of fatal hemorrhage. It has been used for several years to treat patients with coronary thrombosis, but its continuous use to prevent them is new. Autopsy studies of the patient who died revealed no ill effect from long continued use of dicumarol.

Science News Letter, November 16, 1946

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INVENTION

Man Resembles Martians In New Pressure Suit

➤ MEN WILL LOOK like Martians when they zoom their jet-planes into the stratosphere, if a pressure suit designed by three Goodrich engineers comes into general use. U. S. patent 2,410,632, issued to R. S. Colley, C. P. Krupp and D. H. Shook, has been assigned by them to the B. F. Goodrich Company.

The problem was to encase a man in something that would maintain normal atmospheric pressure around his body at great heights, yet allow complete freedom of movement. The torso and upper arms could be covered with pieces resembling fourteenth-century plate armor, but greater flexibility had to be provided for the coverings of elbows, hips and knees.

This was achieved by annular bulges of rubber-impregnated fabric, one above another, giving the general appearance of a series of pneumatic tires. Longitudinal straps hold the segments in line.

Over the wearer's helmeted head is a second, transparent covering, looking very much like an inverted goldfish bowl, gasketed securely against the ring-shaped neckpiece. Tubes for air and oxygen and wires for heating electricity are let in through one hose attachment at the waist.

Science News Letter, November 16, 1946

An eggshell is about 98% calcium carbonate.

YOUR HAIR

AND ITS CARE

By O. L. Levin, M. D. and H. T. Behrman, M. D.

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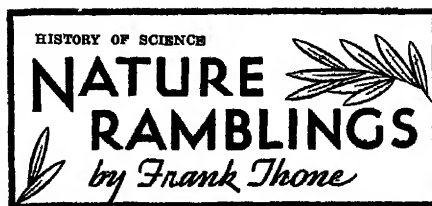
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A Poet's Botany

➤ PROBABLY everyone who has looked at flowers at all carefully has been struck with the similarities between their bright petals and the green leaves on the stem. So obvious is the homology between the two that it is common to hear persons who do not know the names of the parts of a flower refer to petals as "leaves."

This resemblance between leaves and petals was responsible for the venture of the great German poet, Goethe, into the field of botany, and probably for his interest, as a rather serious amateur, in science generally. He pushed the homology as far as he could—and thereby fell into some serious errors—but in the process he produced one of the most interesting essays in speculative botany that was ever published. Titled "An Attempt to Explain the Metamorphoses of Plants," it appeared in 1790, when the poet was 41 years old. A new translation into English, by Dr. Agnes Arber, has just been published by the Chronica Botanica Company, (\$15.00).

Goethe saw all plant appendages—sepals, petals, stamens, pistil, bracts, stipules, segments of seed-pods—as metamorphosed leaves. The examples he cites show that he was a close observer of the things he saw in the gardens of his patron, the Duke of Weimar, and in the woodlands around that small but favored city. He paid special attention to the reversion of stamens to petals in double flowers, with traces of their origin in the form of pollen-containing anthers sometimes cropping up on the metamorphosed members.

In his attempt at an explanation he was not so fortunate. He started out with a preconceived idea (always fatal in science) that the "crude saps" of the

roots and more remote region of the stem became progressively "refined" as they proceeded towards the flowering apices, the final stage of refinement being the "fertilizing fluid" that resulted in reproduction and the growth of the seed.

The scheme was just too diagrammatic and neat. It was the physiology and developmental morphology of a poet and philosopher, rather than of a scientist. Where Goethe used his eyes and told what he actually saw, he was a good botanist; where he tried to solve the riddle of how these things came to be by pure speculation, he went astray.

Science News Letter, November 16, 1946

MEDICINE

Bearded Lady's Gland Cures Addison's Disease

➤ CURE of a case of Addison's disease by the grafting of an adrenal gland from another patient of the bearded lady type is announced by Dr. L. R. Broster, surgeon to Charing Cross Hospital, and Dr. H. Gardiner-Hill, physician to St. Thomas's Hospital, in a report to the British Medical Association.

The patient, a 33-year-old woman, had been ill for six years with nervousness and depression and stomach trouble which she described as a "nervy tummy." A year before the operation her skin took on a smoky brown color characteristic of Addison's disease.

For a year before the operation she had to take four teaspoonfuls of salt daily and also was given injections of adrenal cortical hormone. Failure of the adrenal glands to produce the normal amount of this hormone is the cause of Addison's disease.

Up to the present time, 14 months since the gland-grafting operation, the patient has been well and no longer takes salt or hormone injections.

The gland which cured her was taken from another young woman who suffered from overactive adrenal glands. This affected her sex glands and she became something like the bearded ladies of circus sideshows, having to shave daily. She also was depressed, but her mental condition was more serious than that of the Addison's disease sufferer. She had hallucinations and, contrary to previous experience, her mental condition got worse after the gland was removed. Under psychiatric treatment she recovered and was left with only slight hairiness of her face.

Science News Letter, November 16, 1946

Books of the Week

AERODYNAMICS—A Wiley Sherwood—*McGraw-Hill*, 220 p., diagrs., and tables, \$2.75. In this book the author covers the more practical aspects of both theory and experiment in the field of aerodynamics. Emphasis has been placed upon the physical phase of the theory in order to hold the student's interest and to provide a general background suitable for more intensive mathematical work in the subject.

ARE YOU CONSIDERING PSYCHOANALYSIS?—Karen Horney, M. D., Ed.—*Norton*, 262 p., \$3. This book is directed to those who may be considering analysis for themselves or for their friends or relatives. Wherever possible its authors have given factual information. They convey an understanding of the meaning and goals of analysis and give to those who are seriously interested a clearer picture of its nature and aim.

CATHODE-RAY TUBES AND INSTRUMENTS—*Du Mont Laboratories*, 160 p., diagrs., illus., and graphs, \$1.00. A reference manual which contains the latest information pertaining to design, specification, and application of commercial cathode-ray tubes, oscillographs and associated equipment.

CONDUCTION ANESTHESIA: Clinical Studies of George P. Pitkin, M. D.—Edited by George L. Southworth, M. D. and Robert A. Hingson, M. D.—*Lippincott*, 981 p., illus., diagrs., and tables, \$18. A new book based on a 25-year clinical study of conduction anesthesia. The editors give a clear, authoritative picture of the clinical advantages of all anesthetic methods which interrupt nerve conduction without disturbing the mental faculties of the patient or interfering with body metabolism.

THE EARTH AND THE STARS—C. G. Abbot—*Van Nostrand*, 288 p., illus., diagrs., graphs and tables, \$3.75, rev. ed. This is the story of the enigma of the universe; of the stars and constellations and their relationship to the earth. The book contains information for everyone who wishes to learn more about the natural phenomena that surround him.

THE HUMAN FRONTIER: A New Pathway for Science Toward a Better Understanding of Ourselves—Roger J. Williams—*Harcourt, Brace and Co.*, 314 p., \$3. The author of this trail-blazing book discusses the urgent responsibilities of natural scientists in the field of social relations. In simple, straightforward language, he tells of the latest research work concerning human behavior.

MEDICAL RESEARCH: A Symposium—Austin Smith, M. D., Ed.—*Lippincott*, 169 p., illus., \$5. Here is medical research revealed with the candid perception of key men in the field. They trace the development of medical research from the philosophic view point, through laboratory and clinical trials, production, and publicizing. They present the role and inter-relation of all participants in medical research—the objectives, obligations and purposes of their work.

OIL ACROSS THE WORLD: The American Saga of Pipelines—Charles M. Wilson—*Longmans, Green and Co.*, 318 p., illus.,

\$3.50. In this book, the author traces the evolution of the pipeline through its infancy. In words easy to understand, he brings the pipeline to maturity, and along with the pipeline he traces the growth of the petroleum industry.

A PASTURE HANDBOOK—A. T. Semple, H. N. Vinall, C. R. Enlow and T. E. Woodward—*Gov't Printing Office*, 88 p., illus., and tables, paper, 15 cents U. S. Dep't of Agriculture Misc. Publication No. 194.

PRIDE—THE SADDLE HORSE—*Encyclopaedia Britannica Press*, 40 p., illus., 50 cents. The action photos give the true life story of the training of Pride, the saddle horse. Its magnificent pictures will thrill even the youngest lovers of horses. *Encyclopaedia Britannica True Nature Series*, Book 7.

THE PRODUCTION OF TOBACCO—Wightman W. Garner—*Blakiston*, 516 p., diagrs., illus., and tables, \$4.50. Here is a comprehensive survey of the essentials of tobacco production and its problems, including the inter-relations of other phases of the industry.

QUANTITATIVE CLINICAL CHEMISTRY: Interpretations—John P. Peters, M. D., and Donald D. Van Slyke—*Williams & Wilkins*, 1041 p., diagrs., tables and charts, \$7. This volume covers the overall energy changes, and the chemistry and metabolism of the three major foods—carbohydrates, lipids, and proteins. Volume I.

RITUAL: Psycho-Analytic Studies—Theodor Reik—*Farrar, Straus and Co.*, 367 p., \$5. The author opens the first volume of his study of the psychological aspects of religion with a consideration of ritual rather than of mythology. The analytic research into ritual shows the connection between the religion of today and the superstitious beliefs of prehistoric times and throws a surprising light on the significance of modern and ancient religion.

SO YOU WERE ELECTED—Virginia Bailard and Harry McKnown—*McGraw-Hill*, 264 p., diagrs., and illus., \$1.80. In the student's own language and with appealing informal approach, this book brings to students real understanding of the qualities needed for successful student leadership, the duties of the leader, and the carrying out of student social activities in the modern high school.

TEXTBOOK OF ABNORMAL PSYCHOLOGY—Carney Landis and M. Marjorie Bolles—*Mcmillan*, 576 p., illus., and diagrs., \$4.50. This textbook has been written primarily for the use of the undergraduate student. The material is directed to those students who are majoring in psychology, education, sociology, biology, or theology.

VICTORY OVER PAIN: A History of Anesthesia—Victor Robinson, M. D.—*Schuman's*, 338 p., illus., \$3.50. In this book the author has written a comprehensive and fascinating account of the entire story of anesthesia, ranging from the "Drugs and Dreams" of earliest times to "Curare," the horror-drug of the jungle whose poison has been tamed by science and turned into a messenger of mercy.

Science News Letter, November 16, 1946

MEDICINE

Vaccine to Protect Against Flu Epidemic

► THE NEW vaccine against influenza A and B protects about 60% of those vaccinated. In event of an epidemic it might reduce absenteeism from 500 man-days to 200 per 1,000 employees. It would reduce overall yearly rate of absenteeism from all respiratory diseases such as colds, tonsillitis, grippe and influenza by only 6%.

These figures were presented by Dr Anna M. Baetjer, of Johns Hopkins University, at the meeting of the Industrial Hygiene Foundation.

The common cold, she reported, accounts for one-fourth the annual billion-dollar loss due to respiratory diseases. There has been no reduction in absenteeism from this cause in the past 30 years.

"A study of past epidemics suggests that an epidemic of influenza A may possibly occur this winter but it is not certain whether such an epidemic would be general throughout great areas or would affect only certain local regions," Dr. Baetjer said.

"Industrial vaccination should not be started until there is some evidence of either influenza A or B in the community or neighboring areas. Such warnings may be expected from public health authorities or certain influenza research laboratories in various parts of the country. Persons sensitive to eggs should not be vaccinated since serious allergic reactions and even death may occur."

Science News Letter, November 16, 1946

BOOKS

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New Machines And Gadgets

☼ **ALL-METAL** thermometer with a dial face has extra pointers that record maximum and minimum temperatures during any period, and remain in position until manually reset. The pointer that changes with the temperature pushes these others along with it as it moves in either direction.

Science News Letter, November 16, 1946

☼ **INNER GRATE** for a tobacco pipe is a perforated aluminum disk that fits in the bowl, leaving a small space between it and the bottom. With it the draft is distributed to the whole body of tobacco, creating a smooth and soothing smoke, it is claimed.

Science News Letter, November 16, 1946

☼ **READING LAMP**, attachable with spring clamps to a bedstead, gives bright or dim light as wanted. The electric bulb is within a double casing, one section of which rotates within the other when a string is pulled, thus enlarging or narrowing the slit through which the light escapes.

Science News Letter, November 16, 1946

☼ **SHOWER HEAD** for shower baths has a simple arrangement for dislodging any particles, rust or sediment that may become lodged within it. The bullet-shaped head has a button on its face which, when pushed, permits the water to drive out all foreign matter.

Science News Letter, November 16, 1946

☼ **WALL VENTILATOR**, of the built-in type, has gleaming white grille of plastic instead of the usual metal. It offers a



minimum resistance to air flow and is easily cleaned. The picture shows how it harmonizes with other installations. Its three-bladed propeller type fan is behind the grille.

Science News Letter, November 16, 1946

☼ **CARGO** landing container, bomb-shaped, remains upright during descent from a plane. Its upper cover is a removable cap that automatically lifts off en route and acts as a parachute. The container proper can slide like a piston within an air compartment in the lower

end, the air thus compressed lessens the impact shock on landing.

Science News Letter, November 16, 1946

☼ **VIOLINS**, clarinets and other musical instruments are made of transparent plastics that were used extensively for bomber noses and gun turrets during the war. It is an acrylic plastic, easily molded and light in weight. The instruments have good tone, and are unaffected by weather changes.

Science News Letter, November 16, 1946

☼ **AIR-FOAM** nozzle for fighting mechanically creates the foam by scientifically mixing water, air and a special foam-forming liquid within it and discharging the mixture through the nozzle tip. The air-foam is particularly effective in extinguishing fires in flammable oils, paints and varnishes.

Science News Letter, November 16, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 337. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

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Your friend has seen Science News Letter in your home or office. Maybe he or she has picked it up, showed interest. If you would like us to mail him a sample copy free, we will be glad to do so. We will be glad to mention your name when we send this sample. Please fill in your friend's name and address below and mail this entire coupon to Science News Letter, 1719 N. St., N. W., Washington 6, D. C.

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What is the test that may help children to like school? p. 309.

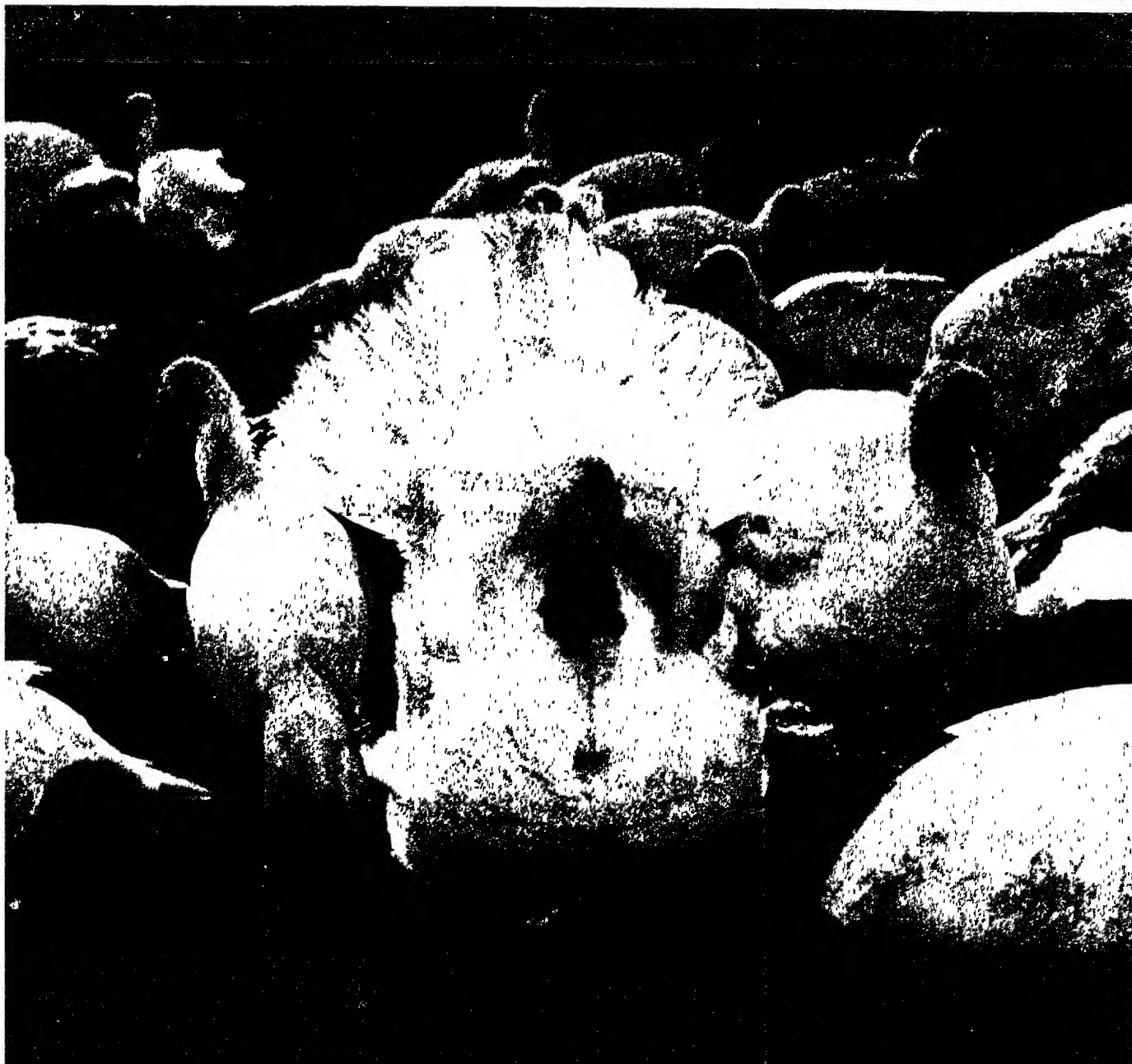
WILDLIFE

How does a male "mother" fish incubate eggs? p. 312.

Where published sources are used they are cited.



SCIENCE NEWS LETTER



A SCIENCE SERVICE PUBLICATION



RCA Victor "Eye Witness" television receiver shown above, gives you 52 square inches of picture brilliance.

A referee's eye view of every play — by Television!

You feel as though you were right there at the game—when you see it through RCA's brilliant television.

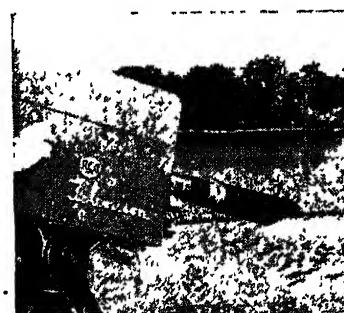
Football fans as far as 250 miles away from the stadium have enjoyed watching many of the big games this fall through NBC telecasts. And football fans become television fans when they see how closely the camera follows the ball.

At the game, the sensitive RCA Image Orthicon television camera sees every line plunge, kick, pass and run. It may be a cloudy day or the sun may go down but you still enjoy the *bright sharpness* of the RCA Image Orthicon camera.

On the screen of your RCA Victor home television receiver none of that bright sharpness is lost. For after you've tuned in the game, the new RCA Victor "Eye Witness" Picture Synchronizer automatically "locks" the picture in tune with the sending station—eliminates any distortion—assures you of *clearer, steadier* pictures.

For television at its best, as pioneered at RCA Laboratories, you'll want the receiver that features the most famous name in television today—RCA Victor.

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RCA Image Orthicon television camera—developed at RCA Laboratories—makes close-ups out of long shots. It enables television to go anywhere by freeing it from the need for strong lights or sunshine.



RADIO CORPORATION of AMERICA

PHYSICS-CHEMISTRY

All Nobelists American

Dr. P. W. Bridgman won the physics award; the chemistry award went one half to Dr. J. B. Sumner, and the other half to Drs. W. M. Stanley and J. H. Northrop.

➤ AMERICAN scientists have scored a clean sweep of the world's highest honors in physics, chemistry and medicine and physiology by winning all three of the Nobel prize awards in science for 1946.

Dr. P. W. Bridgman of Harvard University won the physics award, while Dr. J. B. Sumner of Cornell University was awarded half of the prize in chemistry and Drs. W. M. Stanley and J. H. Northrop of the Rockefeller Institute for Medical Research, Princeton, N. J., shared the other half. These winners were announced following the earlier award in medicine and physiology to Dr. Hermann J. Muller of Indiana University. (See SNL, Nov. 9, 1946.) Germany, which swept the Nobel scientific honors in 1905, is the only other country to take all three prizes for a single year in the 46 years of the awards.

Enormous pressures, measured in millions of pounds per square inch, were what won Prof. Bridgman the Nobel prize in physics. Except for their lower temperatures, they approach conditions prevailing in the deep interior of the earth, and give us some idea of strange states in which ordinary matter may exist at a thousand miles straight down.

"Hot ice", or solid water 163 degrees Fahrenheit above ordinary boiling point, was produced in one of his massive presses, which can build pressure up to as much as six million pounds per square inch. This strange form of water is denser than ordinary ice, and will sink in water. In another of his experiments, Dr. Bridgman showed it to be highly unlikely that diamond can be formed from carbon by pressure alone.

Dr. Stanley will receive part of the Nobel prize in chemistry for researches on the borderline of life. He showed that the filterable viruses that cause such plant diseases as tobacco mosaic and aster yellows are not living organisms like ordinary bacteria, but non-living, crystallizable proteins with huge and complex molecules that in many respects behave as if they were alive.

Colleague of Dr. Stanley in the Rockefeller Institute laboratories at Princeton, and sharing half the Nobel prize with him, is Dr. Northrop. His most notable work has been in the field of enzymes, the chemical reagents that make digestion, respiration and other vital processes possible. In 1930 he prepared crystalline pepsin for the first time. This fall he announced the discovery of a mother



NOBELISTS—Dr. W. M. Stanley (top), Dr. J. B. Sumner (center), and Dr. J. K. Northrup, winners of the Nobel Prize in chemistry.



NOBEL PHYSICIST—Dr. P. W. Bridgman, winner of the Nobel prize in physics, works at duplicating earth pressures.

substance of all proteins, whether they occur in meat, enzymes, viruses or antibodies. This mother substance he has named proteinogen.

The other half of the prize in chemistry goes to Dr. Sumner, who was the first scientist ever to crystallize an enzyme. He prepared crystalline urease

in 1926. This enzyme is important in the nitrogen cycle in nature. Eleven years later, in 1937, he crystallized the important enzyme, catalase, which protects living cells against the hydrogen peroxide they form in their own respiratory processes.

Science News Letter, November 23, 1946

CHEMISTRY

Iodine Purifies GI Water

Disinfectant tablet contains iodine, which makes water in GI canteens taste better than that with a chlorine disinfectant.

➤ WATER FROM GI canteens in the future will be safer and taste better, thanks to a new disinfectant tablet which uses iodine instead of chlorine to purify the water.

Chlorine and chlorine compounds, stand-bys in water disinfection for almost 40 years, as ordinarily used cannot be counted on to protect troops in the field from amebic dysentery or schistosomiasis. The parasites of these diseases when in the cyst stage are too resistant to disinfection by such means. It would take at least six standard Halazone tablets, for example, to disinfect a canteen of warm water in 36 minutes. After this treatment, the soldier probably would not drink the water because of the unpleasant taste. Even with strict supervision, it was sometimes difficult to keep soldiers from drinking water from streams or wells of doubtful purity, rather than use the chlorine-disinfected water.

Search for more satisfactory canteen disinfectants was led during the war by Dr. Gordon M. Fair of Harvard under OSRD contracts. Quarternary ammonium compounds and triiodides were investigated. One of the latter, triglycine hydroperiodide, was finally selected by the Quartermaster Corps as having the highest military characteristics.

Tablets of this dissolve quickly, liberate seven and one-half parts per million of elemental iodine, enough to kill quickly the cysts of amebic dysentery germs and to reduce the number of typhoid, cholera and bacillary dysentery germs from about one hundred million to five or less per 100 cubic centimeters (about three ounces) of water.

Soldiers and Marines who tried the tablets did not object to the taste or odor of the water. Additional tests of the new "tablet" water purification individual

iodine," will be carried out during the coming year.

Science News Letter, November 23, 1946

CHEMISTRY

Soviet Chemists Join World Chemistry Union

➤ SOVIET CHEMISTS have pledged themselves to participate in a post-war revival of the International Union of Chemistry when representatives of 21 nations gather in London next July.

Despite lack of Soviet participation in such United Nations sponsored organizations as UNESCO, Dr. Alexander Nesmeyanov has been elected vice-president of the international union upon nomination of the Moscow Academy of Sciences. He takes the place of a German dropped because Germany, with Japan, is now barred from the world chemical organization.

Dr. Marston Bogert of Columbia University, as president of the union, has received assurances from other Soviet scientists that they will aid in re-establishing the world organization of chemists.

Difficulty in locating some officials of the union who disappeared in various countries during the war is hampering the plans for reconstituting this world organization which last met in Rome in 1938.

Science News Letter, November 23, 1946

Some scientists believe that *bees* work in the dark to keep the honey soft, as it crystallizes in the light.

The *coyote* eats almost four times as many rabbits and other rodents as it does domestic animals.

ENGINEERING

Silica Particles Used As Modifiers in Cement

➤ SILICA PARTICLES almost too small to be seen under a microscope, which are formed as a byproduct in metallurgical operations, can be used as modifying agents in cement, James W. Sharp of Los Altos, Calif., has discovered. He has assigned rights in his patent, No. 2,410,954, to the Permanente Cement Company, one of Henry Kaiser's firms.

Science News Letter, November 23, 1946

Alaskan coastal forests contain spruce trees up to five feet in diameter and over 150 feet high.

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MEDICINE

Returned Servicemen Spread Amebic Dysentery

► LOOK for a postwar increase of amebic dysentery, or amebiasis as doctors prefer to call it because dysentery is not always a feature of the disease.

This serious illness, as well as malaria, intestinal worms and giardiasis, are the so-called tropical diseases likely to be spread through the United States by returned servicemen, experience at New York City's tropical disease diagnostic service through the past year shows.

Among 1,151 veterans, amebiasis was discovered in 10% by routine examinations, Drs. Howard B. Shookhoff and Wheelan D. Sutliff reported to the American Public Health Association.

More men with this infection undoubtedly would have been picked up if repeated examinations could have been made. The incidence of the disease among these veterans is much higher than the general level of infection in cities like New York. Spread of the disease will be difficult to detect because reporting of it is very incomplete and there may be a long period between the time of infection and the development of symptoms which lead to its detection.

Science News Letter, November 23, 1946

NUTRITION

Get Enough Calories To Help Your Steaks

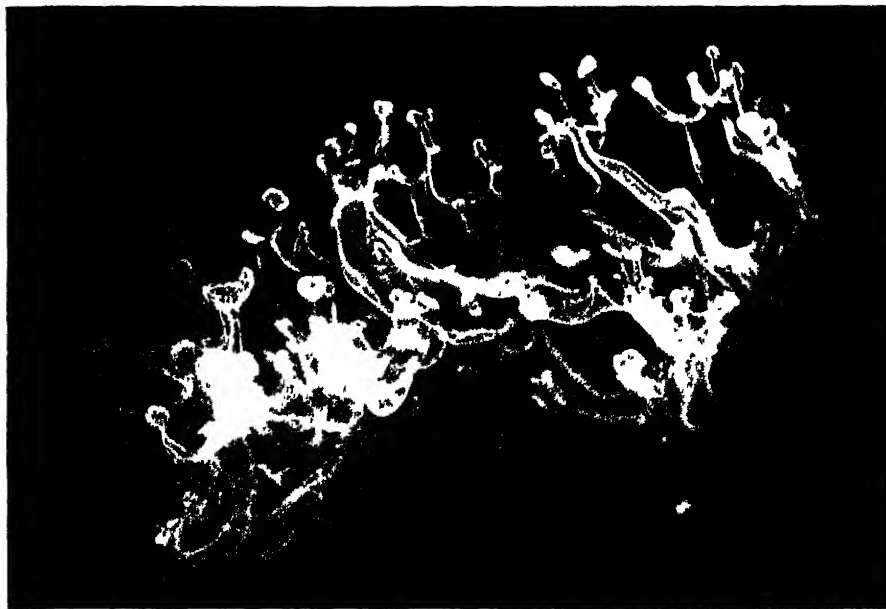
► TAKE A TIP from the Quartermaster Corps, when all the meat you are hungry for comes back on the market, and be sure to eat enough other foods to supply the calories you need.

Proteins, which you get from meat, are not utilized to the best extent unless calories of a minimum level are also eaten, research indicates.

Why some foods, like meat, have appetite appeal and why bread and some other foods can be eaten in large amounts for unlimited periods while large amounts of other foods lose their appetite appeal are questions the Quartermaster Corps is now trying to answer.

Rations which will taste better to future GIs and therefore be eaten and do their job of nourishing the soldier are the object of research in a new program. Civilians may also benefit since some of the studies will be on such fundamental problems as the relation of digestion and psychological factors to food acceptance and therefore to good nutrition.

Science News Letter, November 23, 1946



CURLY CLOUD—When the cloud is seeded with ice germs, made of dry-ice, the cloud enters its first stage of transformation from water droplets to snow. This photograph was taken at the General Electric laboratory a few seconds following initial seeding.

PHYSICS

Man Makes Snow

Artificial snow may be used to clear supercooled clouds over airfields and keep ice off wings of planes. Solid carbon dioxide is used in making snow.

► ARTIFICIAL man-made snow may be made in the future to clear dangerous supercooled clouds over airfields.

Using dry-ice fragments against a cloud of supercooled droplets in a laboratory cold chamber, Vincent J. Schaefer, General Electric scientist, found that the droplets formed ice crystals that fell like snow.

An airplane over Greylock Mountain in western Massachusetts was used to bombard a natural cloud with the solid carbon dioxide and snow fell.

This method may be used to protect planes from the supercooled clouds which are one of the chief causes of icing on aircraft. Maj. Gen. Curtis E. LeMay, chief of research and development for the Army Air Forces, is one of those interested in testing the artificial snow system.

Mr. Schaefer reported his laboratory method for creating the ice crystals in *Science*, (Nov. 8). He first formed super-cooled clouds by introducing moist air into a small commercial freezing unit

with the temperature of the resulting cloud about minus 15 degrees Centigrade.

When he hung a piece of dry-ice in the cooled cloud, the cloud was completely converted into ice crystals in 10 seconds. The crystals increased in size when more moisture was added.

Examining the crystals under a microscope, Mr. Schaefer found they were similar in size to those of "diamond dust," the small natural crystals found on cold mornings.

In addition to using dry-ice as a source of ice nuclei, he used a rod cooling in liquid air. When this passed through the supercooled cloud, it left behind a trail of submicroscopic nuclei that caused the cloud to dry up as the ice crystals grew.

Many clouds in the air are in "supercooled" condition. They contain water droplets whose temperature is below freezing, but which are not frozen. Science has not yet found the reason for this condition.

Science News Letter, November 23, 1946



NO DRUMSTICK—This turkey won't feed hungry boys on Thanksgiving Day; it is one of the 30 ocellated turkeys brought to the United States from Guatemala.

ORNITHOLOGY

Family Thanksgiving Fowl To Be White This Year

See Front Cover

➤ **THIRTY OCELLATED** turkeys, more brilliantly colored and smaller than the familiar Thanksgiving fowl, have arrived from Guatemala—but not to grace Thanksgiving tables. Their great-grandchildren may make good eating, for Dr. J. S. Newell of Connellsville, Pa., who collected them, plans to establish the species in this country.

In the meantime, the U. S. Department of Agriculture is breeding a variety of small white turkey, shown on the cover of this SCIENCE NEWS LETTER, especially for family use. The male bird averages 15 pounds dressed, and the hens' average weight dressed is only eight pounds, so the family dinner table won't get competition from hotels and restaurants.

This is the first season of popularity for the snow-white gobbler, officially called the Beltsville Small White. White turkeys have been bred at the Beltsville Experiment Station for ten years, but they were not introduced to the public until 1941. Then, because they cost more to produce and price ceilings were uniform for all turkeys, breeders were not very interested. Only about one four-hundredth of this year's turkeys will be the Beltsville White. It is predicted that the number will increase considerably by next fall. The small white turkey is plump and broadbreasted.

Science News Letter, November 23, 1946

AERONAUTICS

Army Liaison Plane Has Folding Wings

➤ **SPECTACULAR** take-off and landing characteristics feature the new Army liaison airplane for use in observation, communication, and photographic work. It can take off in 230 feet and has landed in 227 feet at 43.5 miles per hour.

The new plane, equipped with folding wings and adjustable landing gear, can be towed over rough ground by military vehicles or can be hauled in a truck. Without having its propellers removed, it can be towed aloft by another plane, glider fashion, and then released on its own power.

The Army designation of the plane is L-13. It will be constructed by the Consolidated Vultee Aircraft Corporation, and is designed to replace the L-5 "Flying Jeep." It is an all-metal plane approximately 32 feet long with a wingspan of 40.5 feet. Its empty weight is less than a ton and its useful load about a half ton.

The plane is powered with a 245 horsepower Franklin engine, has a cruising speed of 92 miles per hour, and a range of 368 miles. Skis can be installed to replace the landing wheels, and floats can be used instead of the landing gear.

Science News Letter, November 23, 1946

RADAR

Radar-Equipment Takes Pictures of Hurricane

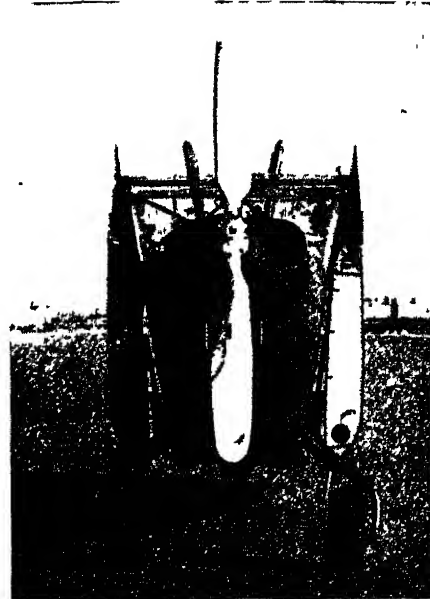
➤ A **RADAR-EQUIPPED** plane flew through a hurricane east and northeast of Miami, Fla., Sept. 12 and 13, to make the first radar pictures of a hurricane ever made from aircraft, the Navy revealed.

The pictures, made aboard a Navy Privateer, show how the storm appeared on the radar scope, as compared with the visual description brought back by the crew who flew the storm.

The eye-witness "log" of Ens. Wilfred J. Remillard, USNR, Fairhaven, Mass., aerologist on the flight, tells how the plane fought its way through the hurricane's turbulent winds of as high as 85 knots.

In the "eye" of the big storm, he reported little rain and moderate turbulence as the hurricane raged around its center.

Radar scopes showing hurricanes had previously been photographed aboard ships and at shore stations, but the Navy reports that the September flight is the

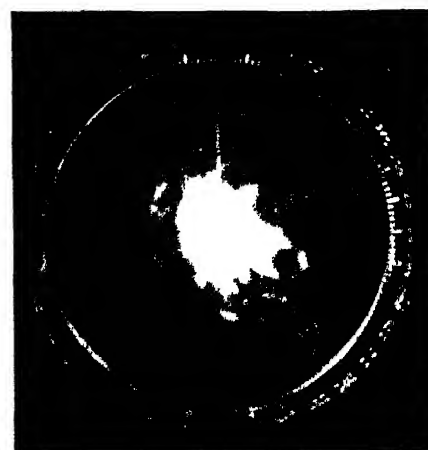


L-13—Folding wings permit the plane, made by the Consolidated Vultee Aircraft Corp., to be towed or hauled over rough terrain. The landing gear is adjustable.

first time radar pictures have been made of a hurricane from aircraft.

The microwave pulses of radar of an appropriate frequency are echoed by water droplets in the air, forming patterns which trained observers can recognize. On the ground, however, radar is limited by the optical horizon, while it has an almost limitless horizon high in an airplane.

Science News Letter, November 23, 1946



RADAR PICTURES—This picture, taken as the plane was leaving the storm area, shows the eye, or center, of the storm as the black dot. Official U. S. Navy Photograph.

MEDICINE

"Blue Babies" Saved

Stitching the lung artery to the aorta is a new system that saves babies that suffer from lack of oxygen in blood stream because the artery is so narrow.

➤ MORE "BLUE BABIES" may be saved by surgery through a new technic developed by Drs. Willis J. Potts, Sidney Smith and Stanley Gibson, of Children's Memorial Hospital and Northwestern University Medical School.

Two children have already been "tremendously" helped but a third died, they report to the American Medical Association (Nov. 16)

The new method consists in stitching the lung artery to the aorta, big artery leading directly from the heart and from which the body's whole artery system proceeds. In the original operation devised by Dr. Alfred Blalock and Dr. Helen B. Taussig of Johns Hopkins, the lung artery is stitched either to an artery supplying blood to the shoulder and arm or to one supplying blood to the neck and head. In the latter case, there is danger of not enough blood reaching the brain. This led the Chicago surgeons to work out the new method.

Dr. Blalock and associates and another surgical team had considered use of the aorta for the operation but concluded

from preliminary studies that paralysis of the legs might result. It would follow temporary anemia of the spinal cord resulting from clamping off the aorta and stopping blood flow through it during the operation.

This difficulty was overcome by a special aorta clamp devised by Drs. Potts and Smith. The flanges of this clamp enclose the aorta but pinch off only a small part of it. Blood continues to flow through the unpinched portion of the aorta, while the surgeon makes a three-eighths inch cut in the small pinched portion and stitches to this a similar sized cut in the lung artery.

A defect in the lung artery, present when the baby is born, is the cause of the condition remedied by the operations. The artery is so narrowed that only a little blood can be pumped through it. That little cannot pick up enough oxygen to supply the body. That is why the children are weak, pant on slightest exertion and after eating, and have deep blue colored skins.

Science News Letter, November 23, 1946

PHYSICS

Powerful Betatron X-Rays

➤ POWERFUL radiations from betatrons can be used for quick spotting of flaws in heavy steel, giving increased detail and greater speed than ordinary X-ray equipment. This promise of an important new tool for industry was emphasized as the new 20,000,000 electron volt betatron at the U. S. Army Arsenal, Picatinny, N. J., was demonstrated.

For industrial X-ray work, the betatron's radiations can penetrate 20 inches of steel in 20 minutes and detect flaws .002 inches wide and one thirty-second of an inch deep. By making enlargements on radiograph film directly, the machine speeds the time required for X-ray inspection.

One competent laboratory technician can operate the betatron, making it practical to X-ray with the betatron every piece of heavy equipment produced instead of the one out of 50 or 100 units

as is now done, it was predicted.

Housed in a special X-ray laboratory, the new betatron is reported to be ready for use by medical and research groups seeking to perfect methods of applying betatron roentgen and electron radiations to clinical therapy.

The betatron combines a transformer winding and an X-ray tube in a porcelain "donut." The machine was built by Allis-Chalmers.

Science News Letter, November 23, 1946

NUCLEAR PHYSICS

General Electric Ends Monopoly on Betatron

➤ VOLUNTARY termination of its patent-protected monopoly of the betatron, heavy-artillery piece among atom-smashers, was announced by the General Electric Company. Its seven basic patents on this machine are now listed in



BETATRON—Exposure control ionization chamber is connected in the installation of the 20,000,000 volt betatron at the U. S. Army Arsenal at Picatinny.

the register of patents available for licensing by the U. S. Patent Office.

Rights to build and use betatrons will be granted without fee to educational and other non-profit institutions. Firms operating for a profit will be charged a moderate royalty. One such license has already been issued to the Allis-Chalmers Manufacturing Company.

A betatron has been ordered by the Manhattan District Project, and another by the University of Chicago. Both will be used in nuclear research.

A betatron consists of a massive electromagnet surrounding a doughnut-shaped glass vacuum tube in which electrons are speeded up until X-rays of 100,000,000 electron volts are produced.

Science News Letter, November 23, 1946

ZOOLOGY

Rabbits Like to Eat Dried Stinging Nettles

➤ THISTLES, traditionally favored tidbit of donkeys, have prickly rivals in stinging nettles, which have been found to be good rabbit fodder. They have to be dried, however, before rabbits care to eat them, English rabbit-breeders have found. In recent experiments conducted by W. King Wilson of Harper Adams Agricultural College at Newport, Shropshire, rabbits fed on freshly cut nettles failed to thrive.

Science News Letter, November 23, 1946

CHEMISTRY

**Ethyl Silicate Paint
Is Heat, Fire Resistant**

► A COLORLESS liquid mixed with pigments promises new paints which resist heat, retard fire and do not darken with age. The liquid is ethyl silicate, use of which was reported to the American Chemical Society by H. D. Cogan and C. A. Setterstrom of the Mellon Institute of Industrial Research.

The new paints are expected to be particularly useful in decorating and protecting theatrical scenery, industrial fabrics, furnace castings and the walls and chimneys of chemical plants.

Pigments to be used with ethyl silicate include ochre, sienna, chromium oxide, iron oxide, titanium oxide for white and carbon black for black.

Ethyl silicate has previously been used in protecting stone statues and private dwellings from weathering and for increasing the hardness of stone, brick and concrete in building construction.

Science News Letter, November 23, 1946

PUBLIC HEALTH

**Cafeterias Have Dirtier
Dishes than Restaurants**

► DISHES ARE NOT washed as clean in cafeterias as in luncheonettes and restaurants with waiter service, Hyman Kleinfeld and Leon Buchbinder of the New York City health department found in a survey of 1,005 New York restaurants.

The quality of washing as measured by the swab rinse test was in general "very poor." The situation is probably as bad in other places as in New York.

More than three times as many cups and glasses washed by machine passed the test for cleanliness as those washed by hand. But only about two-fifths even of the machine-washed passed the test, and almost nine-tenths of the eating places used hand washing methods entirely or in part.

Hand-washed spoons and forks "passed" in as high a percentage as the machine-washed spoons and forks.

Only about 5% of the hand-washed silverware came from establishments that really made a serious attempt to get these utensils properly cleansed. The findings with this small group were about 50% better than those from the remaining 95% of the samples which came from establishments

in which less care is taken.

Another small sample washed by a special silverware machine yielded a passing percentage about twice as good as the general average for machine washing.

Science News Letter, November 23, 1946

PSYCHOLOGY

**New Evidence Scores Men
Better Drivers than Women**

► HERE'S NEW evidence in the argument as to whether men are better drivers than women:

Tests conducted by highway safety engineers at the recent Ohio State Fair showed that the men have a quicker reaction time. That is the time it takes after seeing a hazard to apply the brakes.

In tests on more than 1,000 drivers, the engineers found that men had an average reaction time of fifty-seven hundredths of a second, compared with sixty-two hundredths of a second for the women.

Your reaction time increases with age, the tests revealed, but persons under the age of 20 are slower in applying the brakes than those in the 20-29 group. Above the age of 29, the time increased.

The machine used to test the reaction time of drivers was the perception-reaction device designed and built by the division of traffic and safety of the Ohio Department of Highways. A chronoscope measures the time a driver takes to lift his foot off the accelerator and press down the brake pedal of the controls of a standard automobile after a red light is flashed.

Science News Letter, November 23, 1946

INVENTION

**Lucite Guides Light
In Code Translation**

► DOT-AND-DASH telegraphic code printed on paper tape can be translated into electrical sending over the wire by a device on which Paul M. Rainey of Martinsville, N. J., has received patent 2,410,104. Instead of shooting light through the tape to a photocell on the other side, with consequent gambling from accidental spots and imperfections on the tape, Mr. Rainey's invention uses reflected light, guiding the reflection from the lamp to the tape, thence to the photocell by means of a V-shaped piece of Lucite. Patent rights are assigned to the Federal Telephone and Radio Corporation.

Science News Letter, November 23, 1946

IN SCIENCE

PUBLIC HEALTH

**Western, Middle States
Rank Highest in Health**

► THE FAR WEST and the middle states were given top ranking in health over all regions of the United States by Dr. Carl W. Strow, of the Research Council for Economic Security, Chicago, in a report to the American Public Health Association.

The southeast and southwest regions went into the low ranks designated as underprivileged health regions.

Health rankings were made on the basis of infant deaths, tuberculosis death rate, deaths from six infectious and contagious diseases and the death rate in the age group one to 60 years.

Climate, population make-up, public health and medical care facilities, economic resources and culture account for the differences in health ranking.

Equal health opportunities throughout the nation can be provided in two ways: (1) by shifting financial resources within the country; (2) by economic and cultural reconstruction of the underprivileged areas.

"Both should be used," Dr. Strow declared.

Science News Letter, November 23, 1946

ELECTRONICS

**Electronic Organ Has
Tones of 1,333 Pipes**

► WARTIME electronics work has produced a new musical instrument which boasts the numerical combinations of a pipe organ with 1,333 pipes. The electronic organ was demonstrated to the Acoustical Society of America.

Named the Connsonata, the new organ produces tones and controls pitch electronically. There are no moving mechanical parts as the instrument produces tones with vacuum tube oscillators.

Developed by C. G. Conn Ltd., Elkhart, Ind., the electronic organ is claimed to be more capable than the conventional pipe organ in interpreting orchestral compositions transcribed for the pipe organ. It has keyboard and pedals similar to the pipe organ.

Science News Letter, November 23, 1946

E FIELDS

BOTANY

Some Folks Cultivate Hay Fever's Cause, Ragweed

➤ RAGWEED, the bane of hayfever victims' existence, is actually cultivated in the Dominican Republic and used by the country people there in poultices for sundry aches and pains.

This curious bit of folk medicine is reported in *Science* (Nov. 8) by a father-and-son botanical team, H. A. Allard of Washington, and Howard F. Allard, now doing research on rubber problems, with headquarters at Ciudad Trujillo.

The ragweed cultivated in the Dominican Republic is not the same species as either of the two most common trouble-makers found in this country, though it is closely related. Oddly enough, despite the cultivation of the weed, persons sensitive to ragweed pollen seldom have to sneeze in the island republic. There just isn't enough wild ragweed to count.

Science News Letter, November 23, 1946

ICHTHYOLOGY

Salmon Add New Mystery To Their Migration Habits

➤ DO SALMON eggs "remember"?

A new angle has been added to the already tangled riddle of salmon migration by the failure of Canadian fisheries men to restock a depleted river, once rich in fish, by planting its headwaters with eggs taken from other waters in the same system. The story is told by Dr. R. E. Foerster, director of the Biological Board of Canada.

Eagle river in British Columbia, once a fishing ground for the high-grade, red-fleshed sockeye salmon, long ago lost its profitable silver horde. In an effort to build it up again, millions of eggs were transplanted from two other sources over more than ten years. The eggs hatched all right, and before the young fish left on their migration to the sea many of them were marked by clipping certain fins.

When the time came for the matured fish to come in from the sea and migrate upstream, the marked individuals were very carefully watched for. But of thousands of marked fish only a few scattering individuals were ever caught and

identified.

They did not turn up in other rivers, either. Dr. Foerster suggests that the fingerlings may have failed to reach the sea, either through capture by other fish or by remaining permanently in a lake that is part of the Eagle river system. There is, however, no proof for this theory. But if the explanation does not hold, no other satisfactory one seems to be at hand.

Science News Letter, November 23, 1946

PSYCHOLOGY

Teachers Can Prevent Mental Breakdowns

➤ TEACHERS can help to prevent mental breakdowns, Dr. Morton A. Seidenfeld, psychological services director for the National Foundation for Infantile Paralysis, declared.

Most competent teachers can learn to recognize early signs and symptoms of behavior which show the child's mental health needs attention.

Orderliness, politeness, taking part in prescribed activities and freedom from misbehavior, many teachers will be surprised to learn, may be a veneer concealing deep-seated mental disturbances in the child.

To give real mental health help to the children, the teacher must eliminate in herself those attitudes which pay premiums on the child's capacity to conform superficially in the class room.

Science News Letter, November 23, 1946

NUTRITION

Food, Time Needed To Restore Starving

➤ ALL THE starvation during the war was not in European famine areas and concentration camps. There was a starvation area in Minnesota where 34 men were found suffering from hunger, weakness, anemia, edema, loss of endurance, polyuria, bradycardia and depression.

This was a man-made starvation undertaken in the interests of medical science.

Conclusion of the study reported by Dr. Ancel Keys of the University of Minnesota who directed it: Food and time, not vitamin pills or protein supplements, are what is needed to restore the starving to health. Between 3,000 and 4,000 calories per day and from six months to one year are the amounts of food and time needed.

Science News Letter, November 23, 1946

MEDICINE

Diphtheria Epidemic Need Not Be Feared

➤ FEAR THAT we are in for a serious diphtheria situation in the United States is dispelled by study of diphtheria epidemic trends, Dr. Gaylord W. Anderson, Mayo professor and director of the University of Minnesota School of Public Health, reported to the American Public Health Association.

The only significant episode in the past five years was the "amazingly high" diphtheria rate reached in certain occupied areas in northwestern Europe. Appearance of new, virulent strains of diphtheria probably had less to do with this than secondary epidemiological factors such as poor sanitation, housing and health facilities.

The rise in diphtheria in the United States during the past two years was probably due to normal periodic fluctuations of the disease. It is now declining rapidly in those parts of the country chiefly responsible for the rise.

Science News Letter, November 23, 1946

CHEMISTRY

U. S. May Apply Mica Substitute as Insulation

➤ MICA SUBSTITUTE, a German wartime development for use in electrical instruments, may find American applications in the manufacture of high frequency insulation materials for radar and other equipment. It is a synthetic resin.

Manufacture of this material involves making a vinyl resin known as a vinyl carbazole and changing it into a polyvinyl carbazole. A solution of this in tetrahydrofuran can be cast in thin foils. These were used as mica substitutes in condenser dielectrics in Germany.

A report, prepared by Dr. G. M. Kline of the National Bureau of Standards, who studied the method in postwar Germany, has just been issued by the Office of Technical Services, U. S. Department of Commerce.

Orders for the report (*Polyvinyl Carbazole in Germany*: PB-33272; photostat, \$1; microfilm, \$1; 11 pages) should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and accompanied by check or money order, payable to the Treasurer of the United States.

Science News Letter, November 23, 1946

ENGINEERING

Ships Made From Models

Miniature model ships are made from blueprints and tested in water at the Navy's Taylor Model Basin in Washington before any ship is constructed.

By MARTHA G. MORROW

➤ WARSHIPS of an atomic-age Navy are afloat near Washington today. Slim, sleek, cutting the waters of an inland "sea," they are models of ships to be.

Boys who like to build models envy the serious scientists whose life work it is to test submarines and seaplanes, motor boats and aircraft carriers, landing barges and luxury liners. These are all tried out in miniature even before detailed plans are put upon the drawing board.

Looking like an elongated super-Quonset hut nestled in a suburban valley west of Washington, the Taylor Model Basin is the longest and best-equipped experimental basin in the world. Here millions of dollars are saved by building and rebuilding small wooden versions of ships of the future.

No ship's keel is laid for the Navy until a working model is pulled through the waters of the model basin and passes stringent tests. Because the performance of a finished ship can accurately be forecast from tests tried on wooden models, more efficient ships ply the seas to give the United States a fleet second to none.

Model Is Hollow

The ship model employed in these tests is usually about 20 feet long. Without superstructure, it is hollow and fashioned from layers of Western pine glued together. A rough profile of the ship is first cut in the wood. With planes, sandpaper and infinite patience, this is shaped to represent the outer surface of the ship's hull. From keel to deck, the ship is made to scale, conforming to the blueprint specifications to within a hundredth of an inch.

The ship is painted to preserve it and help the model slide through the waves, then weights are added to give the proper water line and center of gravity. The model is then ready to be towed over one of the main basins to test the shape of the hull and determine the power needed to drive the full-size ship.

The model is pulled at various speeds underneath a carriage that looks like a bridge on wheels. Starting from rest, the carriage slowly acquires the required speed and keeps it uniformly throughout the test. The model, sliding through the water, produces waves such as would be formed by a full-size craft. The actual resistance of the miniature ship in pounds and hundredths of a pound is measured as it cuts through the water.

The proper locations of bilge anti-rolling keels and other appendages are determined by the way in which the water flows around the model. These appendages cannot cut across these lines of flow without tending to slow down the ship.

The model is painted white, then small holes are bored at strategic places. Hydrogen sulfide in solution is fed through these holes. When the model speeds across the water, this acid leaves dark lines on the exterior of the hull, indicating the lines of flow of water.

During the self-propelled test, the model is driven under its own power

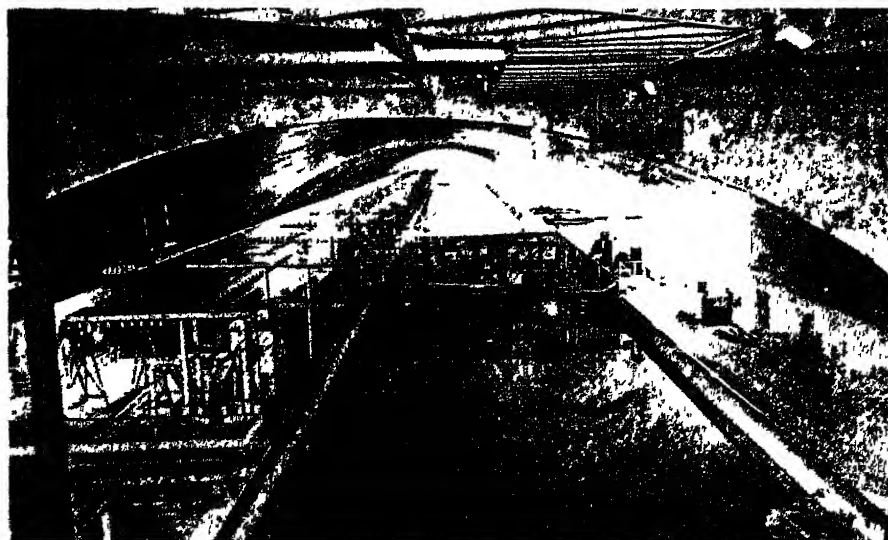
along the basin with small model propellers. An operator in the carriage moving overhead regulates the speed of the ship. From this test even more accurate measurements are secured of the power needed for specific speeds to be obtained by the full-size vessel.

Experiments conducted at the basin showed that certain ships would drive easier by extending the bow in a blunt or rounded form below the water. By incorporating the bulb bow, the enormous bow wave usual in such ships was greatly reduced, with a corresponding reduction possible in engine power.

Three Towing Tanks

Under the arched roof of the Taylor Model Basin are three enormous towing tanks, each designed for a particular kind of work. Models of large ships are towed or self-propelled in the large deep-water basin. This is 963 feet long, 51 feet wide, and 22 feet deep; an extension now nearly completed will make it 2,775 feet long.

River and harbor craft are tested in a shorter shallow-water basin that joins the large tank. This basin is 303 feet long, 51 feet wide and 10 feet deep. Its depth, however, can be varied to represent rivers, canals and channels likely



CRYSTAL-CLEAR—The water in the shallow-water basin and deep-water basin where ship models are tested at the Navy's Taylor Model Basin reflects the arched ceiling.

to be encountered by barges and tugboats under test.

The far end of the shallow-water basin swings around in a J shape. This is especially useful in testing a ship's ability to twist and turn when evading a torpedo.

PT boats, seaplanes and pontoons are tested in the high-speed basin that runs parallel to the large basin. This is 1,168 feet long, 21 feet wide and 10 feet deep. So that torpedoes and other high-speed craft can be run at full speed, the length of this basin is being greatly increased. When completed this winter, with the extension it will be three-fifths of a mile long. The carriage will be capable of running 70 miles an hour—a real thrill for those who climb aboard.

So that all measurements will be absolutely accurate, the carriage rails running along both sides of each tank follow the curvature of the earth. This means that the midpoint of the high-speed basin is about five-eighths of an inch higher than the ends. The rails had to be set with this fantastic accuracy because the actual forces involved in towing the models are so small that if gravity had a chance to work on the carriage, it would invalidate the results of the test.

Still Water in Basins

In each of these three basins, the model is towed through water of mirror-like stillness. In the circulating water channel, on the other hand, the water flows with river-swiftness and the model is held stationary while measurements are taken. Here tests may be conducted for an indefinite period. Floats, mines and torpedoes in particular are tested in the circulating water.

The water channel consists of an open-top test section 22 feet wide and 60 feet long in which flows a stream of water nine feet deep. The model can be viewed and photographed through windows in the walls and bottom of the channel.

An exact copy of the propeller of a full-size boat is tested in special water tunnels. In these water circulates at a known speed through a closed circuit. The propeller is mounted on a motor-driven shaft projecting into the test chamber.

Photographs are taken through glass port-holes in the sides. The air pressure above the water in the test chamber is lowered by vacuum pumps so that the combined effect of atmospheric and water pressure on the model will be in proportion to that of the full-size propeller.

The effectiveness of the propeller is



NO INSIDES—Without superstructure, a model ship is hollow and fashioned from layers of Western pine glued together.

determined by watching the formation of water-vapor cavities or "bubbles" on the propeller blade surface. These are made visible by means of stroboscopic illumination—flashes of light timed so as to make the moving blade seem to stand still. Too many bubbles signal the need for a change in size or shape of the blades.

The headquarters for nautical experimentation is named in honor of Rear Admiral David Watson Taylor, responsible for model testing of ships in this country. It was he who planned the original experimental basin at the Washington Navy Yard and for years guided its research.

Super Model Basin

But with the advent of a two-ocean Navy, the Washington Tank proved inadequate for its many tasks and also its equipment was fast becoming obsolete. Thus plans were drawn up for a super model basin, the best in the world.

Construction of the Taylor Model Basin was authorized by Congress in 1936. The basin was completed and put into full commission just prior to Pearl Harbor. Capt. H. S. Saunders is its new director.

Carderock, Md., some 12 miles from Washington, in the valley of the Potomac, was made the site of the new establishment for several reasons. Here solid rock, needed for accurate align-

ment of the rails of the towing carriages, was near the surface. An ample supply of clean, fresh water was available. There was little traffic to disturb the alignment of the towing carriage rails or their foundation.

Fresh water is used instead of salt water because of its unvarying weight and performance. The values secured are reinterpreted to apply to salt water.

Plant life must be kept to a minimum in the basin water, so no sunlight enters the windowless building. The water surface is skimmed each morning so that no film will interfere with the performance of the models.

Each class of ship built or even considered during the war was tested in the model basin. LSTs, LCIs, new destroyers and carriers were all tried out here. Models of older (See page 332)

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Do You Know?

World *butter* production has declined with the expansion and consumption of other, more profitable, dairy products.

Most *headaches* are due to migraine or to muscular tension associated with anxiety and emotional tension.

A *housefly*, beginning its reproductive activities in early spring, might have over 5,000,000,000 descendants by fall if all lived and reproduced.

Carbon, from wood soot and other sources, has a beneficial effect in most soils; it causes bacteria to work faster and accumulate humus and fix more nitrogen from the air.

Parchment diplomas awarded by many colleges are a sheepskin product coming to the United States largely from England; one British parchment factory is said to have been in operation for a thousand years.

Shrimp develop from tiny size to five-inch crustaceans in coastal waters in a few summer months, and, when grown, go out from the shore to spawn; then they go farther to sea to shoals where they remain, never spawning again.

YOUR HAIR

AND ITS CARE

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(From page 331)

battleships and cruisers to which blisters had to be added to improve under water protection underwent experiments here first.

With the return of peace, test runs are now being made of luxury liners and pleasure craft. The laboratory is authorized not only to conduct research for the Navy and other branches of the government, but for private shipbuilders and designers who pay the cost of the work.

The structural performance of metals is also studied at this marine laboratory. Both full-size and model-scale beams, columns, riveted and welded joints are tested on an alternating stress machine.

Strain Tested

The amount of stress and strain a wide variety of structural specimens will withstand before breaking is estimated on another apparatus. A new testing frame has been devised so that forces can be applied from all three sides in testing the structural strength of metals.

The nature of an explosion and its effect upon the structure of a ship is studied in a pentagonal pond built nearby. Sections of steel plate with bulkhead doors are lowered into the pond and pictures are taken from a bathysphere to show what actually happens when the TNT goes off.

The path of a model bomb or torpedo after it strikes the water is watched through the transparent walls of an enormous tank. Glass windows three-quarters of an inch thick and four times as strong as ordinary plate glass of the same thickness form one side and one end of the tank. Continuously filtered, crystal-clear water is used to insure clear photographs, complete to the minutest detail.

Air Flow Checked

Extensive tests check the flow of air over the decks of carriers, or around the bridges and upper structures of ships. In these tests a model of a carrier deck, cut off at the water line, is set up in a wind tunnel, also used in testing planes. Threads pasted to the model show the path taken by the wind and the eddies created.

Lilliputian launchings were made of big ships built on rivers with only a short run to the other side. Proper models of ships were mounted on miniature launching ways to show precautions needed to keep ships built at such Navy Yards as those at Norfolk and Philadelphia from running aground. Scale mod-

els of snubbing chains or anchors were used to stop the ship's run. From these models, the necessary precautions were devised and full-scale ships performed almost exactly as predicted from the models.

Small-Scale Replica

A small-scale replica was built to test the effectiveness of the anti-submarine net outside San Francisco harbor. The model, carried up and down by the carriage over the big model basin, showed that to be effective the whole scheme of mooring had to be changed.

Two separate shops, one woodworking and the other metal-working, form an integral part of the basin. Models of ships, aircraft and other forms to be tested are fashioned by experts skilled in building in wood something that will eventually be constructed in steel. All special equipment, instruments and other gear as well as models in metal are made in the other shop.

Problems ranging from how best to load a ship to how to identify our fleet, from the effectiveness of enemy designs to the best kind of seasick pills, are all handled at the basin. For questions concerning anything that is propelled, towed or projected on or through the water, or driven through the air, they either have the answer or can get the answer for you.

Science News Letter, November 23, 1946

Only about 1% of the *carbon* atoms found in nature occurs as carbon 13; 99% of the carbon atoms weigh 12 mass units.



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IN EACH 1947 gift package, there will be several objects of science, and with each object, a museum-style legend card, which will tell at a glance what these THINGS of science are. Included will be the sheets of explanation, that give the interesting details of discovery, of development, of manufacture, and that tell how to perform unusual experiments with the contents of the package.

Since late in 1940, packages like these have been going forward to members of the THINGS of science group. Glance over this list, then decide whether a membership which brings monthly packages on subjects as widely varied as these, isn't just the thing for that most unusual person on your Christmas Gift list.

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| Fingerprinting | Condiment Plants | Rayon |
| Bi-Metallic | Treated Wood and | Prince Rupert's Drops |
| Sprouting Seeds | Cloth | Felt |
| Whey Candy | Buoyant | Petroleum By-Products |
| Meteorite | Glass Lens | Material Detecting |
| Plant Hormones | Synthetic Rubber | Lignin |
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| Fern Fossils | Casein | Rubber Plants |
| Plastic Coated Yarn | Plywood | Plastic Pilot Aids |

You know the one who would thank you again and again for such a gift. And if you are not yourself a member, you could hint to someone that you'd like it as a gift yourself.

The 1947 THINGS of science will be unusual; every month's package will be a surprise. A Christmas Membership to THINGS of science will bring the 12 units of 1947, plus an extra unit which we will select and add to your gift with our compliments, to arrive in time for Christmas. We will make out and mail a Christmas card with your name as donor, announcing your gift. Each membership is \$4 a year, postpaid. You will find a handy order coupon below.

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MEDICINE

Tooth, Tonsil Snatching Do Not Cure Arthritis

► TONSIL snatching, as it has often been called, has gone out of fashion, but too many persons are still having teeth pulled with the idea of curing their arthritis, it appears from a report by Dr. Richard H. Freyberg, of Cornell University Medical College, in the Journal of the American Dental Association.

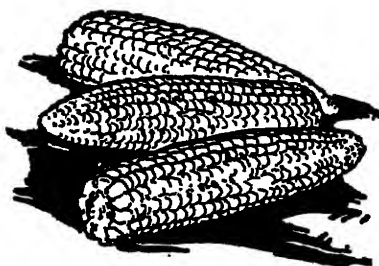
The removal of teeth, or tonsils or other organs, has been done on the theory that the arthritis was caused by infection and that the infection had its focus in a tooth, tonsils, gallbladder or other organ. But there is no proof, Dr. Freyberg states, that rheumatoid arthritis is caused by an infection. Infection in a tooth or elsewhere might act as a trigger setting off the arthritis. Once established, however, the arthritis goes on independently of the infectious trigger, if there is one. So it is doubtful whether removing the focus of infection would cure long-standing arthritis.

A focus of infection should be removed or cleaned up, whether or not a person has arthritis. If he has arthritis, getting rid of the infection should improve his health and perhaps make him better able to fight the arthritis. But he should not expect the arthritis to be cured, and arthritis alone is not enough reason for sacrificing a good tooth or teeth. Dentists recognized this before physicians did.

You may have heard of someone with arthritis who got well after having some or all of his teeth pulled. Doctors have heard and seen such reports, too. Analysis of the reports, Dr. Freyberg says, shows that most of the patients did not have arthritis but had some other disease which would have improved regardless of the treatment.

Besides rheumatoid arthritis, there is another common form known as osteoarthritis or hypertrophic arthritis. This occurs in middle or old age, usually in persons who are otherwise healthy though they may be overweight. A few joints are irregularly swollen and give trouble. One knee may get stiff after sitting for a while and give trouble going up and down stairs. Infection has nothing whatsoever to do with this type of arthritis, so having teeth removed cannot possibly help it, though the teeth may need to be removed because of the condition they are in.

Science News Letter, November 23, 1946



Fundamental Food

► AT THANKSGIVING time we are apt to glorify the turkey and regard as secondary the many other native American contributions to the feast: potatoes both white and sweet, pumpkin and squash, cranberries and blueberries, pecans and peanuts, chocolate and tobacco.

Corn may not appear on the table at all or, if it does, only in the form of cornbread or cornsticks. Yet corn has been the foundation of it all.

The turkey was probably fattened on corn. Certainly his ancestors were, for corn was the only grain possessed by the Indians who first domesticated the turkey and who passed him on to their Spanish conquerors. And for those Indians, whose ruined cities are still among the great wonders of the world, corn was life itself. They ate turkey occasionally; corn they ate every day, as their descendants still do all over Middle and South America.

It is axiomatic among students of human culture that all great civilizations have risen on foundations of grain. Rice-eaters built the vast temples of Angkor Wat and Pnom Penh; men who reared the Pyramids and the Parthenon ate wheaten bread, supplemented with barley and rye; corn was the food of the Mayas, the Aztecs and the subjects of the Incas. And when Europeans settled in this hemisphere, bringing with them their own work and food animals, they learned to eat corn and to feed it to their stock. It has become so characteristically American that we tend to forget that it was American before we ourselves were.

There is good evidence that corn supported the lost Indian cultures within the present United States boundaries. Less spectacular than those of Mexico

and Peru, and less highly organized, the civilization of the ancient moundbuilding peoples was nevertheless relatively well advanced. To erect such imposing monuments of piled earth, with elaborate burial crypts under many of them, required the continuous and coordinated labor of many hundreds of persons. Population densities of even that level cannot be maintained on a hunting-and-fishing basis alone. So it is no surprise to find traces of corn cultivation in the moundbuilder cultures, even as the later Indians in our country were found to be cultivators of corn as well as hunters of turkey and deer.

Science News Letter, November 23, 1946

MEDICINE

Colds Kill More Babies Than Suffocation Does

► UNSUSPECTED colds or other nose and throat infections are probably the cause of many of the 1,600 infant deaths a year which are now attributed to accidental suffocation by blankets, pillows or other mechanical means, Drs. Jacob Werne and Irene Garrow, of New York City's chief medical examiner's office, charge.

Investigating 200 cases of infants allegedly suffocated in crib or carriage, they found by microscopic study that two-thirds of the babies had acute inflammation in the nose and throat in association with other significant damage to organs. Such signs are conspicuously absent in healthy infants dying of proved violence.

More infant lives may be saved, the doctors declare, by teaching parents to recognize the early signs of colds, influenza and the like in babies and to keep the babies away from persons who have colds or similar infections.

Science News Letter, November 23, 1946

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Books of the Week

ACRYLICS And Other Dental Resins—Stanley D. Tylman and Floyd A. Peyton—*Lippincott*, 480 p, illus., diags, and tables, \$10. A book that appraises the use of acrylics in their newly established position in dental practice. It covers all the accepted uses of the synthetic resins in dentistry, and compares the use of the resins and baked porcelain, older denture-base materials and other restorative materials.

ACTIVITIES OF THE INTERDEPARTMENTAL COMMITTEE ON SCIENTIFIC AND CULTURAL COOPERATION—U. S. Gov't. Printing Office, 45 p, illus, tables, paper, 15 cents Dept. of State Publ. 2622, Inter-American Series 31

THE ANGRY PLANET—John K. Cross—*Coward-McCann*, 239 p, illus., \$2. A fictional account of the first flight by rocket ship to Mars and of the incredible events which took place in several adventure-packed days.

AUDUBON BIRD GUIDE: Eastern Land Birds—Richard H. Pough—*Doubleday*, 312 p, illus., \$3. Everyone who enjoys observing birds can identify quickly and with accuracy various species. This book describes the significant points of identification, voice, range, nesting and food habits, methods by which birds may be attracted, and many other items.

COMMUNICATION THROUGH THE AGES From Sign Language to Television—Alfred Still—*Murray Hill Books*, 201 p, diags, \$2.75. Not a cut-and-dried historical account of the scientific background of communication, but a review of progress and of changing philosophies, particularly as related to scientific expansion.

DEATH VALLEY AND ITS COUNTRY—George P. Putnam—*Duell, Sloan and Pearce*, 231 p., \$2.75. Tales of the pioneers, of the prospectors and Indians and rangers, are set alongside detailed descriptions of the Valley's weather, its flowers, its wild life, its sights and sounds, and its geological past.

DIESEL OPERATION AND MAINTENANCE—Orville L. Adams, Sr—*Prentice-Hall*, 366 p., illus., diags, graphs and tables, \$5

Clear and concise presentation of basic principles and procedures, including the methods and techniques of maintenance and repair.

DIRECTORY OF MICROFILM SERVICES—Compiled by Jurgen G. Raymond—*Special Libraries Association*, 52 p., paper, \$1.50. What libraries can supply copies of periodical articles in microfilm and photoprint, and at what price.

HEALTH INSTRUCTION YEARBOOK 1946—Compiled by Oliver E. Byrd—*Stanford Univ. Press*, 399 p, tables, \$3. A source book, covering a wide range including nutrition, fatigue and rest, mental health and disease, heredity and eugenics, and many other health subjects.

HUMAN RELATIONS IN RESEARCH INSTITUTION MANAGEMENT—William A. Hamor—*Mellon Institute*, 10 p, paper, free. A fruitful discussion of how to get the best out of people in the task of research, reprinted from *Advanced Management*.

INDUSTRIAL RESEARCH LABORATORIES OF UNITED STATES—Compiled by Callie Hall—*Nat. Research Council*, 415 p, \$5. Bulletin of the Nat. Research Council, No. 113, July 1946. The best current list.

MATHEMATICS OF FINANCE—John Northcott—*Rinehart*, 252 p., tables, \$3. A text and simple development for students of banking and finance.

PRINCIPLES OF TOOL ENGINEERING—Raymond Bloom—*McGraw-Hill*, 234 p., illus., diags., and tables, \$2.40. A simple, understandable beginning text covering systems of production, interchangeability and dimensioning as they pertain to tool design, the tool engineer's training, duties, and place in manufacturing; and the basic machine tools.

PROCEEDINGS OF THE PACIFIC SCIENCE CONFERENCE ON THE NATIONAL RESEARCH COUNCIL—*Nat'l Research Council*, 79 p., paper, 50 cents. Bulletin No. 114, Sept. 1946.

REPORT OF THE UNITED STATES EDUCATION MISSION TO JAPAN—U. S. Gov't Printing Office, 62 p, paper, 20 cents. Dept. of State Publ 2579, Far Eastern Series 11.

UNDER THE RED SEA SUN—Commander Edward Ellsberg—*Dodd, Mead & Co.*, 500 p., \$3.50. How the author, with a handful of trained men, reclaimed the Red Sea naval base at Massawa—"the hottest spot on earth."

A WORKBOOK FOR STUDENTS OF BIOLOGY—Gruenberg, Snyder, and Miller, *Ginn and Co.*, 266 p, illus., diags., tables, paper, \$1.32. This workbook is intended to guide the student in planning experiments, in making records, in organizing observations of facts, in using tables and other devices that help in making comparisons, and arriving at more reasonable conclusions.

Science News Letter, November 23, 1946

Because nearly the same sensations are registered by an extremely hot object as by a very cold one, a blindfolded person is unable to tell whether his hand is being burned or frozen.

MEDICINE

Living Muscle Grafted On Dead Heart Muscle

► PATIENTS with some kinds of heart disease may in future have fresh, living muscle grafted onto their hearts to replace dead bits of muscle in their own hearts.

This possibility appears from studies reported by Drs. Mandel Weinstein and Benjamin G. Shafiroff of New York University College of Medicine.

Muscle strips from the abdomen and legs were successfully grafted on the heart muscles of dogs, they report in the journal, *Science* (Nov. 1).

Within two or three days after the operation, the dogs were up and about their kennels, except in some cases which became infected. They were exercised daily with no signs of heart trouble.

The idea of replacing dead parts of heart muscle with grafts of fresh muscle has been suggested before but the New York investigators are apparently the first to develop a practical method.

Science News Letter, November 23, 1946

CHEMISTRY

Sinews from Cattle To Sole Post-War Shoes

► SINEW FROM within the steer's body as well as leather from the outside can now be used for shoe soles. By a process developed originally at the University of Kentucky, the tendon of Achilles, which is the big sinew on the back of the hind leg, can be chemically digested and pressed into sheets of tough, flexible, sole-leather-like material. Full technical details are given in a new publication of the Office of Technical Services, U. S. Department of Commerce.

Science News Letter, November 23, 1946

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Science News Letter, November 23, 1946

☼ **PORTABLE** rectifier, a complete direct-current power supply source with a capacity of 150 watts, is particularly suitable for laboratory and industrial uses because of its size and weight of only 45 pounds. Using a selenium rectifier element, its output is adjustable from zero to six volts with a continuous capacity of 25 amperes.

Science News Letter, November 23, 1946

☼ **PANTS GUARD** for bicycle riders not only holds the trousers tight about the ankle in the ordinary way, but has attached reflector buttons which show red under the glare of the headlights of an approaching automobile.

Science News Letter, November 23, 1946

☼ **SMALL SIZED** compressor for refrigerators requires only as much space as a quart bottle of milk. The unit, with both motor and pump in a hermetically sealed case, weighs approximately 12 pounds, about one-third the weight of conventional models.

Science News Letter, November 23, 1946

☼ **ELECTRO-ACOUSTIC** device for telephone and radio conversations and



signals is worn under the chin instead of over the head like ordinary telephone receivers. Designed like the doctor's stethoscope, a tiny round microphone is at the junction of the plastic tubes that lead to the ears.

Science News Letter, November 23, 1946

☼ **INFRA-RED HEAT LAMP**, now improved with a bulb of hard glass to insure safety and with a ruby-hued filter to reduce glare, fits into any ordinary household socket. While designed for home heat-treatment of aching muscles, it has many other heat applications, such as drying hair.

Science News Letter, November 23, 1946

☼ **FIRE FIGHTING** equipment, for use when airplanes crash, is mounted on a jeep and contains, in addition to ordinary tools, a powered circular saw and a powered push-pull back saw, both for use in cutting into the metal fuselage. A powerful winch operates a grappling hook.

Science News Letter, November 23, 1946

☼ **STAR FINDER**, a simple instrument for amateur astronomers, is designed on the same principle as the equatorial mounting of the astronomer's telescope. It can be mounted on any standard camera tripod. With it, students can locate and identify constellations and stars.

Science News Letter, November 23, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 338. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

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Question Box

ANTHROPOLOGY

What is the fundamental American food? p. 334.

CHEMISTRY

What will make purified water in GI canisters taste better than it used to? p. 324.

ENGINEERING

For what purpose does the Navy use miniature ships? p. 330.

MEDICINE

How can "blue babies" be saved? p. 327.
How is some heart disease treated by grafting? p. 336.

What causes death of babies that is blamed on suffocation? p. 334

NUTRITION

Is food or vitamins needed to restore the starving? p. 329.

ORNITHOLOGY

For what are white turkeys being bred? p. 326.

PHYSICS

Of what practical value is man-made snow? p. 325.

PHYSICS-CHEMISTRY

What nation took the honors in Nobel Prize winners? p. 323.

PSYCHOLOGY

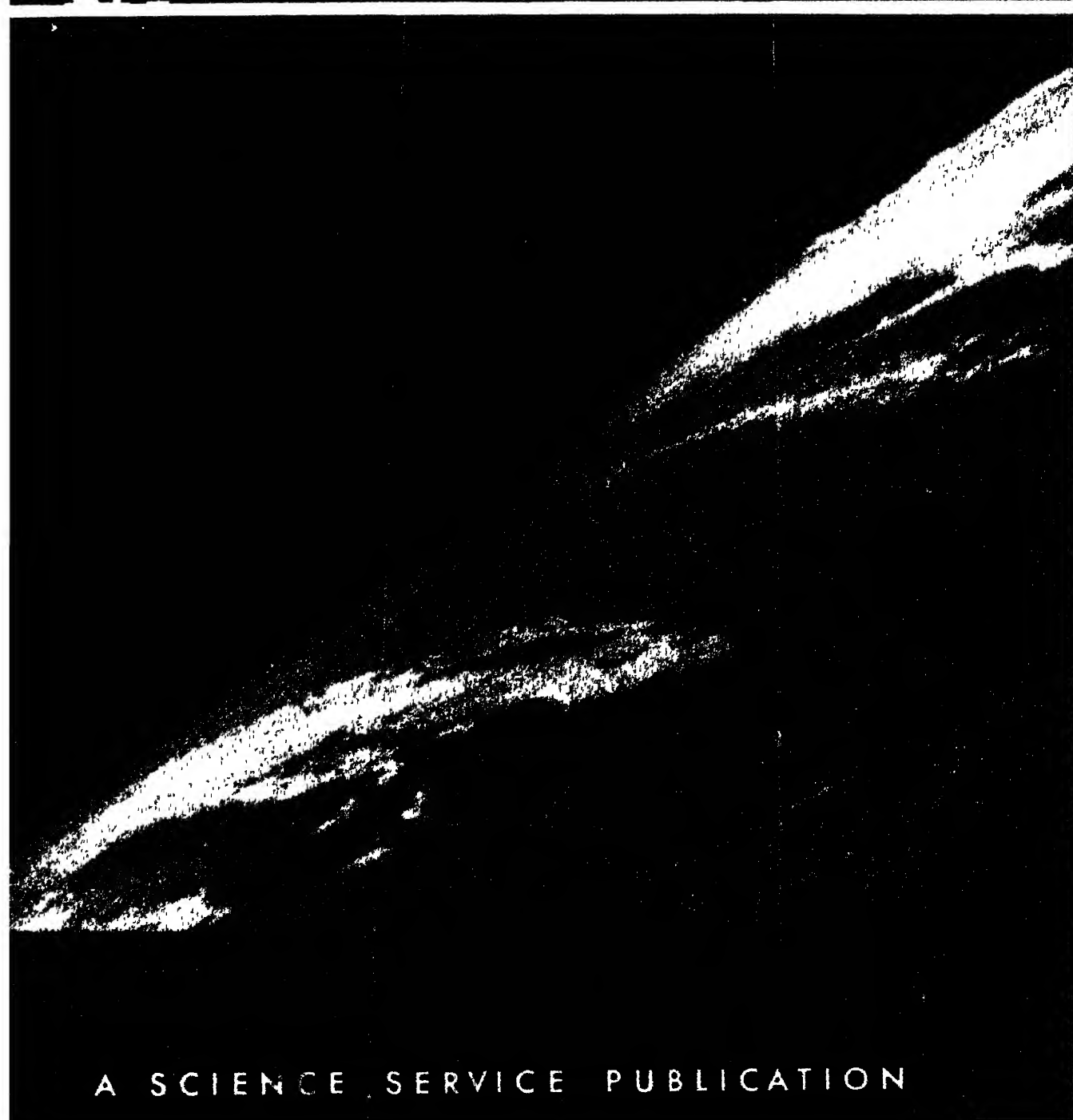
Does evidence indicate men or women to be better drivers? p. 323.

How can teachers prevent mental breakdowns? p. 329.

Where published sources are used they are cited.



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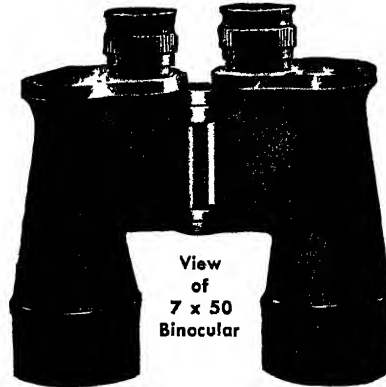
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| 6164-Q* | 26 | 104 | .80 |
| 6168-Q | 29 | 76 | 1.25 |
| 6171-Q | 32 | 171 | 1.00 |
| 6173-Q* | 34 | 65 | 1.00 |
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| 6177-Q* | 39 | 63 | 1.10 |
| 6178-Q* | 45 | 189 | 1.50 |
| 6179-Q* | 46 | 78 | 1.25 |
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| 3021-Q | Amici Roof Prism (3rd grade) | .25 each |
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| 624-Q | Neutral Ray, Filter size 4 1/2" x 2 1/2" | .25 |
| 3022-Q | Round Wedge 65 mm. dia. 16-Q Level Vial, 48 mm. long | 5.00 each .20 each |
| 1040-Q | 6 Power Magnifier—diam. 25 mm. | .25 each |
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| 8029-Q | Dove | 16 mms. | 65 mms. | 1.25 |
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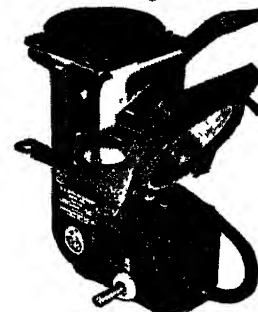
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New sound is in range of human hearing, but apparently exists only in liquid helium at temperatures near absolute zero.

➤ A NEW KIND of sound has been discovered, but you won't be able to hear it. Called "second sound," the new sound is essentially a temperature wave which occurs only in liquid helium at a temperature only slightly above absolute zero.

"Second sound" was revealed by Drs. Cecil T. Lane, Lars Onsager and Henry A. Fairbank after extensive experiments with liquid helium in the Sloane Physics Laboratory of Yale University.

Although well within the range of normal hearing with a tonal frequency corresponding to about middle C, the new sound cannot be heard by the human ear. Apparently it occurs only in liquid helium and ceases when the helium's temperature rises above 2.2 degrees Centigrade over absolute zero, which is approximately 273 degrees Centigrade below zero. Waves of "second sound" travel at a speed of only about 70 feet per second compared with 700 feet per second for normal sound waves.

Temperatures within one-hundredth of one degree of absolute zero were reached in the laboratory experiments with liquid helium. Iron and steel at that temperature would shatter like glass, as would a human finger dipped into the very low temperature material.

While the research in the neighborhood of absolute zero has been limited to scientific discovery, Dr. Lane said practical applications from studies of sub-normal temperatures might produce such revolutionary developments as a new alloy which would reduce electrical resistance and expand power transmission.

He reported that other researchers have already developed delicate heat-measuring devices from low temperature research which may lead to more precise knowledge of the universe.

Describing heat in substances as "a sort of mask," Dr. Lane explained that heat causes vibrations which almost disappear at absolute zero.

"Experience with liquid helium and a temperature of absolute zero hold the

possibility of greater application of the fundamental theories behind all modern physical research," he declared.

Science News Letter, November 30, 1946

CHEMISTRY

Americium Is Purified For Study of Properties

➤ A THIRD of the synthetic, transuranic elements, americium, has been purified in sufficient quantities to permit a study of its chemical properties.

This was revealed for the first time by Dr. Glenn T. Seaborg, University of California nuclear chemist who was a leader in atomic bomb research.

Dr. Seaborg said that the work on americium, element 95, which was done by Dr. B. B. Cunningham at the University of Chicago Metallurgical Laboratory, was "a remarkable achievement in that the amounts available were even smaller than those in the case of neptunium and plutonium, the previously purified synthetic elements."

The scientist also revealed that curium 242, the heaviest isotope of any element so far reported, can be produced by the same chain-reacting pile technique used for obtaining plutonium. Instead of bombarding uranium with neutrons, it would be necessary to bombard americium with neutrons.

Curium is the only one of the synthetic elements not yet isolated in pure form, Dr. Seaborg pointed out. He indicated, however, that this may be possible if and when such isotopes as curium 243, 244, 245, or 246 are produced. Such isotopes, Dr. Seaborg said, may have longer lifetimes than the brief span of the curium isotopes now known.

Science News Letter, November 30, 1946

MEDICINE

Veterans Can Spread San Joaquin Valley Fever

➤ DISCOVERY of an unsuspected health threat from returning veterans is announced by Maj. Sol Roy Rosenthal, Army Medical Corps, and Lieut. John



AMERICIUM HYDROXIDE—The gray matter in the bottom of the capillary "test tube" is pure americium hydroxide, isolated by Dr. B. B. Cunningham. The eye of an ordinary needle is shown for comparison of size.

B. Routien, Army Sanitary Corps, at Bruns General Hospital in Santa Fe.

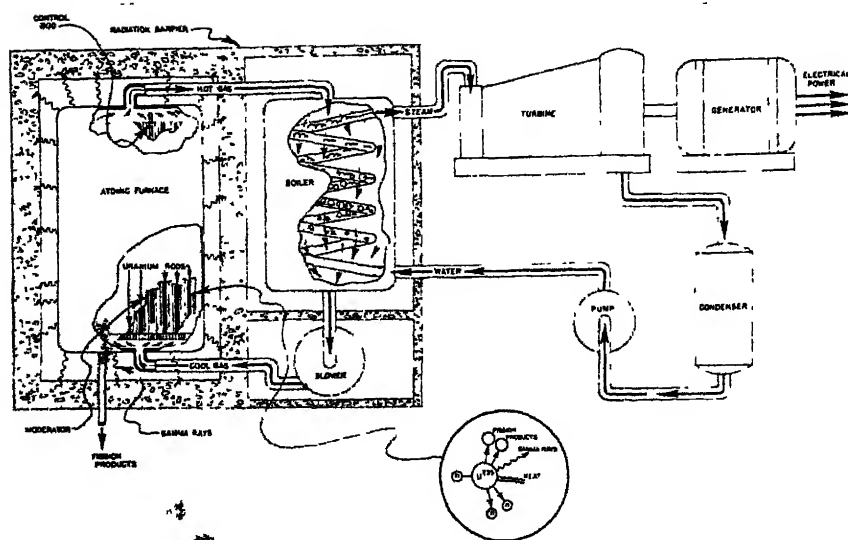
Valley fever, or San Joaquin Valley fever as it is also called, may, contrary to previous universal scientific opinion, be spread from man to animal and from animal to animal, the Army scientists report in *Science* (Nov. 22). It probably can also be spread from man to man.

Patients with this disease must therefore be considered infectious and isolated to prevent its spread until they have been proved non-infectious.

Many soldiers who trained in Texas, Arizona, New Mexico and the San Joaquin Valley, Calif., have returned home carrying the fungus that causes the disease in their bodies. Spread of the disease from them to others in many parts of the United States is possible, in view of these latest findings.

The fungus cause of the disease gets into the body by being breathed in. It may cause either a harmless, self-limiting lung disease or a progressive, chronic and malignant disease which may spread from the lung to any or all organs of the body. Medical name for the disease is coccidioidomycosis. The fungus cause is named *Coccidioides immitis*.

Science News Letter, November 30, 1946



ATOMIC POWER PILE—Diagram shows the principles of the pile, marking man's first effort to harness the atom for peacetime purposes. Construction by the Monsanto Chemical Co. probably will get under way sometime in 1947.

OCEANOGRAPHY

Sea Wave Warning Service

Principal headquarters will be in Honolulu to warn coast dwellers of approaching sea waves like the one that drowned Hawaiians last April.

➤ A WARNING service, to save lives and minimize property damage from earthquake-caused sea waves, is now being planned by the U. S. Coast and Geodetic Survey. It will have its principal headquarters in Honolulu, with additional seismological observatories at Sitka and College, Alaska, and at Tucson, Ariz.

Great sea waves, like the one that drowned 140 people in Hawaii last April, are caused by certain kinds of submarine earthquakes. (See SNL, Nov. 16, 1946.) The exact mechanism of their inception, however, is not yet understood, states Comdr. Elliott B. Roberts, chief of the Division of Geomagnetism and Seismology of the Survey, so that simply locating a submarine epicenter is not sufficient basis for predicting a sea wave. However, prompt location of epicenters is very important, so it is planned to attach alarm devices to seismographs, so that they will give notice the moment they begin to operate. It is also planned to set out newly invented wave detectors, to give notice of abnormal movements in the water near the sea

waves' points of origin.

Observation of abnormal behavior on the part of the sea among the Aleutian islands or along the upper coasts of Alaska can be made, however, by properly located watchers, including Coast Guard personnel. Radio warnings of a sea wave thus caught in the act of getting started can be sent by Army and Navy radio, so that people on threatened coasts can get to safe places, taking valuable portable property and papers with them.

Since sea waves travel at an amazingly high speed, traversing the distance from the Aleutians to Hawaii in as little as five or six hours, it will be necessary to have all the warning service set-up constantly on the alert and ready to function smoothly and with the utmost possible quickness.

Since this is a pioneering effort, it will probably require several months to give observers the necessary special training, as well as to get the interdepartmental communications system into good running order.

Science News Letter, November 30, 1946

GENERAL SCIENCE

Fellowship Grants Are Available for Students

➤ MORE THAN \$15,000 in research fellowships for advanced study in scientific and industrial fields will be made available for the scholastic year 1947-48 by the General Electric Company Educational Fund.

Funds from the Charles A. Coffin Foundation and the Gerard Swope Foundation are being awarded for financial assistance up to \$1,500 annually for students seeking to continue research work. An additional \$500 grant for apparatus may be made. Applications deadline for the fellowships is Jan. 1, 1947.

Science News Letter, November 30, 1946

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RADIO

Radio Waves Pass Through Non-Metals

➤ RADIO WAVES, in a new instrument, do the work of light rays in combination with the well-known electric eye. For some purposes, it has a special advantage. It uses high frequency waves that can pass through a brick wall.

The new microwave instrument was revealed by the General Electric Company's research laboratory. Like the photoelectric cell, it can be used for counting, opening and closing, discarding and signaling. Microwaves, unlike light waves, can pass through non-metallic materials. For this reason the new device can operate through walls and partitions. Its microwaves, also, can be directed around a corner by means of a hollow metal pipe.

The transmitter of the instrument, as assembled, resembles a large flashlight, but weighs only four pounds and is small enough to hold in one hand. It is operated on ordinary household current which it converts into electromagnetic waves of about five inches in length. It uses a parabolic reflector to focus the microwaves in a beam which can be reflected from objects in a manner similar to the way radar impulses and light beams are reflected.

For receiving the radiated beam, an antenna is used, placed at the focal point of another parabolic reflector. A silicon crystal detects the microwave beam, resulting in an electric output that can be registered on a meter, or made to operate a relay which in turn activates a bell or other signaling device.

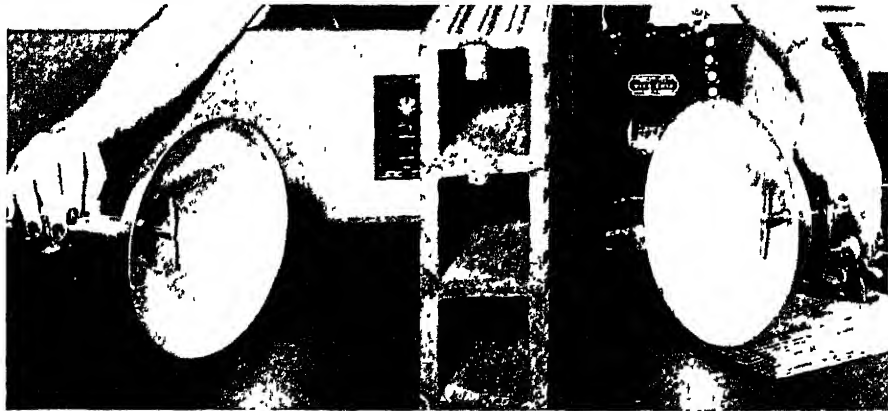
Science News Letter, November 30, 1946

INVENTION

Same Pedal Can Be Used For Acceleration, Braking

➤ LOTS OF PEOPLE try to use the same pedal for both acceleration and braking—and get into trouble. But Nelson I. Perry, Chicago inventor, has devised a combination pedal that will turn the trick. To step on the gas, you tilt your foot forward. To put on the brakes, you push your foot straight down. An ingenious arrangement of links under the pedal keeps you from doing both at the same time. U. S. Patent 2,411,167 has been issued on this invention.

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SEEING THROUGH TILE—"Microwave units," General Electric devices, use high-frequency radio waves to "see" through or around solid walls.

AERONAUTICS

Infra-red Locates Planes

Infra-red rays detect planes as far away as 12 miles by the heat from their engine exhausts. German-developed devices used cesium-silver oxide.

➤ DETECTING a plane 12 miles away by the heat discharged from its engine exhausts was one of the accomplishments of the Germans in their war uses of the invisible infra-red rays. The development came too late to serve the Nazis to any great extent.

Germany made greater strides in developing infra-red equipment for war purposes than America or any of the other Allies, the Institute of Radio Engineers was told by Earl A. Underhill of Wright Field, where much captured Nazi equipment is being studied. The German equipment was bulky and heavy, but more efficient than American infra-red apparatus.

Image-forming detectors for night vision were one of the important devices. They shot out invisible beams of infra-red rays which were reflected back to a receiver by any object in their path. In the receiver the reflected rays were converted into a visible image. The instrument is similar to the sniperscope and snooperscope used by American soldiers, but the German device had a range of 328 yards, more than five times the range of the American equipment.

In the German instrument cesium-silver oxide is used. In this Nazi scientists may have copied an American development. Scientists of the Radio Corporation of America, using cesium, had developed in 1936 an electronic tube

which enabled its user to view a limited field illuminated only by infra-red rays.

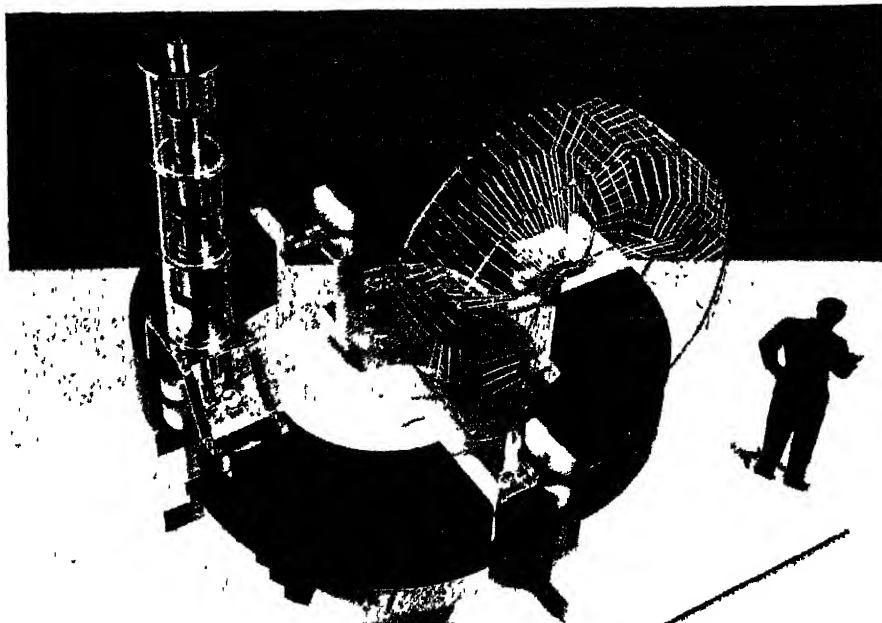
In the receiver of the German instrument, the invisible infra-red reflections enter the cesium photocathode and are transformed to electrons which pass through grids where they are impressed with high voltage and emitted to a phosphor screen, forming a visible image of the reflecting object.

Another German development was a detector to reveal heated objects such as tanks, aircraft and seacraft motors. All heated objects emit infra-red rays, the principal heat waves given off by radiation from a heated body. The German instruments in some cases were image-forming, and in others not. With either the movements of a tank or airplane could be followed.

To detect a plane 12 miles away, an infra-red telescope was used. Variable potentiometers were provided to aid in focussing. With it, objects having a heat radiation no higher than the boiling point of water could be "seen."

Science News Letter, November 30, 1946

Some prefabricated houses are of flimsy construction but over 30 of the leading manufacturers of "prefabs" meet construction standards approved by the Federal Housing Administration which assure durability, warmth and sanitation.



RACE TRACK DESIGN—The 300,000,000 volt synchrotron of which this is a model will produce energy similar to that of cosmic ray particles and permit scientists to go a step beyond atom-smashing and study sub-nuclear particles. Being built by University of Michigan physicists in association with the Applied Physics Laboratory of Johns Hopkins University under special research contracts with the Navy Bureau of Ordnance, it is made up of four quarter circles connected by straight portions. Official U. S. Navy Photograph.

HUMANICS

Humanics Answers Strife

Wars start in people, and an understanding of human nature is the only way to achieve peace, according to Dr. R. J. Williams.

► A NEW SCIENCE to achieve peace between husbands and wives, between labor and management and between nations is proposed by Dr. Roger J. Williams, University of Texas biochemistry professor and discoverer of one of the B vitamins.

"Humanics" is the name Dr. Williams gives the new science. Webster defines humanics as "the study of human nature," parallel to mechanics, dynamics, acoustics and statistics. "The science of human beings" is Dr. Williams' definition of it.

"Only by learning its basic truths, teaching them to our youth, and by extending greatly the boundaries of our knowledge," he states, "can we cope with numerous social problems: education, marriage, health, employment, charlatanism in politics and elsewhere, crime, alcoholism, group bigotry (whose name is legion), and war."

To his fellow scientists and educators Dr. Williams gives a blueprint for the science of humanics in his new book, "The Human Frontier" (Harcourt, Brace and Co., \$3.00).

It is not atom bombs and germ warfare which threaten destruction of mankind but forces within each human being, Dr. Williams charges.

Two obstacles have prevented us from advancing beyond the "ox-cart days" in applying science to human relations, he believes. One of these is the strong tendency in universities and elsewhere to study human beings piecemeal. Anatomy, physiology, biochemistry and psychology are each studied intensively but separately. No one puts together the pieces of the jigsaw puzzle of facts known about man.

The other obstacle is "our devotion to man the statistical creature." We plan for the average man, instead of for each

John and Mary.

The results are about on a par with what would happen from attempting to furnish an entire army with average-sized shoes. An average-sized shoe would fit very few soldiers, though for purposes of calculating the amount of leather required to put shoes on an army it would be valuable to know the average size of the soldiers' feet.

"If science is to go to the bottom of things in the prevention of world destruction, it must study human beings. We must take humanics seriously," Dr. Williams declares, "because we are admittedly the most complex phenomena of which we are aware. If we could understand human beings and why they behave in such outlandish fashion, we would have gained the kind of insight that is necessary."

Science News Letter, November 30, 1946

ORNITHOLOGY

Bikini Tests Did Not Harm Birds of Atoll's Islands

► BIRDS of the little islands of Bikini atoll were completely unharmed by the two atomic bursts last summer, states Melvin Traylor, Jr., Chicago Natural History Museum ornithologist who was project officer for the pelagic fishing survey preceding and during the tests.

After each of the two explosions, biologists made a careful examination of the bird life of the atoll, and found no visible effects. Subsequent examinations showed no noticeable changes in numbers, says Mr. Traylor, adding:

"The birds were continuing with their regular household routines, and were it not for the evidence of the target ships it would be difficult to believe that the bombs had actually exploded. Although there is a possibility of a delayed effect from birds eating radioactive fish, of which there were a few in the lagoon, the bird life as a whole may be considered unaffected by the bomb."

The birds of Bikini are of course mostly seafowl. Among the most notable, and certainly the most beautiful, are the pure white fairy terns, which build no nests, merely laying their eggs on bare branches where a chance rough spot on the bark or the splinters of a short-broken limb give a precarious resting-place.

Another oddity noted by Mr. Traylor was the habit of the frigate birds of catching flying-fish in the air, after they have been scared out of the water by pursuing dolphins.

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PHOTOGRAPHY

V-2 Rocket Movies Show Earth from 65 Miles

See Front Cover

► MOTION PICTURES showing how the earth would look to a man speeding up to 65 miles above the surface in a V-2 rocket have been recovered from one of the Nazi missiles fired over the desert at White Sands, New Mexico.

The movie was made from the fuselage of a rocket fired Oct. 24, and gives a continuous motion picture of the earth's surface at altitudes from 100 feet to 65 miles. Taking the unique pictures was a camera placed in the missile by scientists from the Laboratory of Applied Physics of Johns Hopkins University.

At the peak of the rocket's flight, 65 miles above the earth's surface, a photograph of the horizon was taken showing 40,000 square miles of the earth. It is this photograph that is on the cover of this SCIENCE NEWS LETTER. At that time the horizon was theoretically 720 miles distant, and an observer aboard the rocket would actually have been able to see 1,600,000 square miles of the surface by looking in all directions. This would have included the cities of San Diego, Salt Lake City, Kansas City and San Antonio.

With the rocket flying at a top speed of 4,000 feet per second, the motion picture camera recorded 50 feet of film as the missile soared up to the 65-mile altitude and began its descent. Film ran out 45 miles above the surface on the downward flight. The pictures were made to record the roll and pitch of the V-2, necessary information for interpreting data gathered on cosmic rays and from spectrographic records.

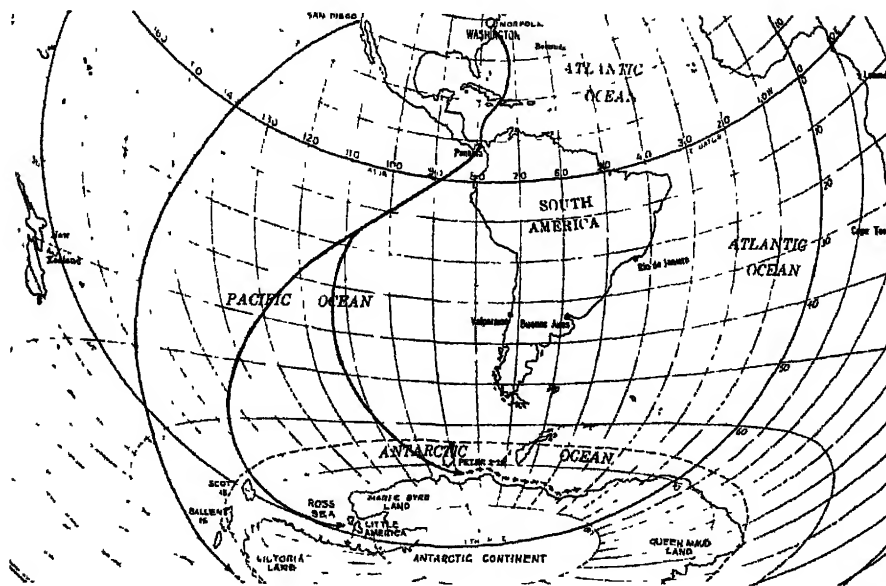
Science News Letter, November 30, 1946

NUCLEAR PHYSICS

Army Still Directing Atomic Energy Plans

► THE WAR DEPARTMENT announced the establishment of a new \$20,000,000 nuclear research laboratory to be operated by the General Electric Company near the firm's home offices at Schenectady, N. Y. Named the Knolls Atomic Power Laboratory, the new unit is the fourth in a network of national laboratories for development of atomic energy.

All such plants have been planned and



JOURNEY TO ANTARCTICA—The three main groups of the Navy's 1947 Antarctic Expedition will take these tracks. The groups are scheduled to leave the United States early in December and proceed into the Antarctic as soon as ice conditions permit. Official U. S. Navy Photograph.

announced by the War Department and its Manhattan District. These national laboratories are being set up as permanent centers of nuclear research, yet the civilian group which has been authorized to guide this program has barely been organized. Maj. Gen. L. R. Groves explains, "The work on this program began many months ago and will be transferred to the Atomic Energy Commission as a part of the broad peacetime development program."

Main argument in favor of the General's program is that a series of delays have left the wartime, Army-bossed Manhattan District the only agency which could do anything about the reconversion of atoms from bombs to peaceful pursuits.

If the Manhattan District had not gone ahead with plans for postwar development, the bomb project's vast resources would still be stalemated on a strictly military basis, losing more valuable time on the threshold of the atomic age.

The other side of the question is whether the recently-named civilian commission will agree with the planning done by their military predecessors. Instead of inheriting an atomic bomb factory and its far-flung subsidiaries, David E. Lilienthal and his fellow commissioners are getting a ready-made post-war system for the development of atomic energy.

Science News Letter, November 30, 1946

GEOGRAPHY

Byrd Leads Expedition Back to Little America

► HERE ARE some facts about the world's least known continent, Antarctica, as outlined by Rear Adm. Richard E. Byrd as he announced plans for another trek to Little America starting in a few weeks:

The southern polar continent is about the combined size of the United States and Europe, but roughly two-thirds of its 6,000,000 square miles have never been seen by man.

A coal deposit was spotted on previous trips within 150 miles of the south pole which would supply the United States with coal for 30 to 40 years.

Evidences of silver and copper have been reported. All metals will be searched for on the current trip, but uranium hunting will not be the main job, according to Admiral Byrd.

It has not definitely been determined whether the continent is one land mass or two islands. The explorer thinks it will turn out to be one solid chunk. The land of the Antarctic is not covered with ordinary ice and snow but with neve, the partially compacted, granular snow at the upper end of a glacier. This is what covered other parts of the earth during the Ice Age.

No woman has ever set foot on the world's southernmost continent.

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HORTICULTURE

Flowers Bloom Year Round With Chemicals, Lighting

► FLOWERS BLOOM regardless of season—chrysanthemums in spring, Easter lilies at Christmas—in the experimental greenhouses of the U. S. Department of Agriculture at Beltsville, Md. It's done by a combination of soilless gardening and controlled lighting, in a technique developed by Dr. Neil W. Stuart, plant physiologist.

The plants grow in greenhouse benches that are really shallow concrete troughs filled with sterile gravel or other nutrientless substitute for soil. Necessary fertilizer salts are supplied in water solution. Juggling the ratios of the various chemical elements can speed up or slow down the plants' tendency to produce flowers.

Further control is obtained by artificially increasing or decreasing the length of time the plants receive light each day. Some plants will not form buds and flowers until the days are growing shorter, others bloom under the stimulus of an increasing length of day. Lengthening of the day need not be continuous, it has been found; a few minutes of artificial light at midnight may have as much blossoming-control effect as full illumination from sunset onward. In commercial greenhouses this is naturally a great money-saver.

Another money-saving discovery is the use of ground-up crude phosphate rock instead of gravel as the soilless-gardening "soil." The plants get as much phosphorus as they need, without the necessity of adding costly phosphates to the nutrient solution.

Science News Letter, November 30, 1946

CHEMISTRY

German Acetylene Uses Worth Millions to U. S.

► TOP ACHIEVEMENT of Hitler's chemists was producing hundreds of synthetics from acetylene gas. That is the opinion of Dr. Oliver J. Grummitt, assistant professor of chemistry at Western Reserve University, who recently returned from an inspection of German chemical plants.

The German processes for using acetylene will be worth millions of dollars to this country. The United States has produced synthetics for plastics, rubber and other organic chemical compounds from petroleum rather than coal, because

acetylene when compressed explodes.

German chemists, led by Dr. Walter Reppe, learned to prevent the explosion and were able to produce a great variety of valuable chemicals.

More raw materials for DDT and synthetic resins were predicted by the American chemist through use of German discoveries in the manufacture of phthalic anhydride for synthetic resins and chloral for DDT.

German chemists were described as now "marking time" until treaties settle the fate of Germany. They have only a limited knowledge of American chemical achievements during the war, Dr. Grummitt said.

Science News Letter, November 30, 1946

ENGINEERING

Water Added to Mixture To Get Water from Oil

► TO GET water out of crude oil, J. A. Guyer of Bartlesville, Okla., paradoxically adds water. He also adds methane or other gas, under pressure. Release of the pressure brings out the fine water droplets, as well as tiny salt crystals, that make trouble in refining. Rights in the patent, No. 2,410,970, are assigned to the Phillips Petroleum Company.

Science News Letter, November 30, 1946

ENTOMOLOGY

Geiger-Muller Counter Tracks Down Beetles

► THE GEIGER-MULLER counter, the radiation-detecting instrument that came to prominence in connection with the Bikini bomb tests, has been put to use in England in tracking down beetles whose larvae are the crop pests known as wireworms. The technique is described in *Nature* (Oct. 19) by G. A. R. Tomes of Twentieth Century Electronics and M. V. Brian of the Rothamsted Experimental Station.

The adult beetles seldom fly, but do migrate by walking on the ground or burrowing beneath it. To study the rate and distances of such migrations, tiny disks of radioactive material were glued beneath the wing-covers of captured specimens, which were then released. The Geiger-Muller counter, of a special type, was carried over the ground, its ticking indicating where the radioactively "tagged" beetles were. It could spot them even when they had burrowed as much as four inches deep.

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IN SCIENCE

CHEMISTRY

N-Propoxy Is 4,000 Times Sweeter than Sugar

► NEW SWEETNESS has come to a world troubled with a sugar shortage. It is a new compound 4,000 times as sweet as canesugar.

By far the sweetest substance known to man, the sugar substitute was developed in the Netherlands during the war, Prof. Pieter Eduard Verkade of Delft Technical University reported to the Chicago section of the American Chemical Society. The sweetening agent is now being manufactured in Europe, and an application for an American patent has been filed.

The new sweetening agent is derived from benzene and chemically is 1-n-propoxy-2-amino-4-nitrobenzene or n-propoxy for short. On your tongue, the tiniest pinch of the substance would still be tasted a half hour later.

Saccharin, the common sugar substitute derived from coal tar, is only 200 to 700 times as sweet as sugar, compared with the new compound's 4,000 times as sweet. Another substitute, dulcine, is 70 to 250 times as sweet. At your dinner table, the new benzene derivative could be diluted with lactose or milk sugar down to only 500 times the sweetness of cane sugar.

Easily obtained in the pure state, the new compound is in the form of orange crystals. The sweetener is only slightly soluble in water, but Prof. Verkade said its great sweetness made it satisfactory.

Science News Letter, November 30, 1946

INVENTION

Sealed Beam Spotlight Developed for Cars, Boats

► WITH A RAY four times more powerful than a sealed beam automobile headlamp, a new sealed beam spotlight for cars and boats has been demonstrated.

The light was developed from the landing lights of wartime aircraft and has a parasol-shaped filament shield to eliminate stray light and prevent a blinding glare. The lamp, built by Westinghouse engineers, has a half-mile range.

Science News Letter, November 30, 1946

E FIELDS

ENGINEERING

Aluminum Shortage Delays Housing Program

➤ ALUMINUM shortage is delaying the housing program. Houses made largely of this light metal were expected to help others of lumber and brick meet America's present needs. Now it looks as if aluminum-house production this winter will fall below expectations.

Aluminum production in the United States will approximate 800,000,000 pounds this year, government officials estimate. Additional aluminum will be obtained from other countries. But the needs are some 40% greater than the total probable supply.

Canada produces considerable aluminum. The present production, however, is being stockpiled for shipment to England in the spring. American producers are hoping that part of it can be obtained now for use in the United States by a three-way agreement of the countries. Under the plan America would ship early 1947 production to the United Kingdom in repayment.

Plants are operating now near full present capacity but will soon be prepared for greater output. A limited supply of commercial aluminum for some purposes is obtainable from scrapped airplanes by melting down the metal in furnaces at a temperature of about 1,350 degrees Fahrenheit. Recovery is about 80 percent.

Science News Letter, November 30, 1946

MEDICINE

Silicosis Is Not Threat To Workers' Health

➤ SILICOSIS, once great hazard to the health of industrial workers, is no longer a threat.

In one research project involving 28 plants, having operations using millions of tons of dangerous silica, only three plants were found to have silicosis hazards, and these hazards were readily overcome.

This triumph of scientific research to protect workers' health was announced by Dr. F. R. Holden, W. C. L. Hemeon and T. F. Hatch of the Industrial Hy-

giene Foundation at its meeting in Pittsburgh.

"The dangerous trades of our fathers have all but disappeared," they reported.

Potentially poisonous dusts, fumes and gases can and are being used every day in modern industry without danger.

"Dust control continues to occupy the major place in the entire array of industrial health problems with which we are concerned," the scientists stated. "It is necessary to distinguish between the silicosis dust problem in industry and the far more common nuisance dust problem. Not infrequently we find nuisance dust exposures to be more injurious to the mechanical equipment than to workmen. Good progress has been made in research directed toward more exact measurement and identification of different kinds of dust."

Science News Letter, November 30, 1946

PHOTOGRAPHY

Army Camera Photographs Ten Miles Above Surface

➤ THE FACE of the earth will hide few secrets from a new Army camera. It is the largest ever built for aerial photography, and will catch details even when airborne 10 miles above the surface.

The 575-pound instrument, with a 100-inch focal length, has unique features to reduce it in size to four feet in height and five in width. It has two mirrors in its optical system to bend the light after it enters the lens. The light enters the lens, is reflected from the first mirror to the second, then to the film, completing the 100-inch light path which forms a figure "4" in a comparatively small, compact area.

Heat control is another feature. It has an interior hot-air circulating system, thermostatically controlled, and a large electrically heated blanket covering its entire exterior. These protections are necessary because of the extreme cold in the very high altitudes at which the camera will be used.

The new camera, now completed and undergoing tests by the Army Air Forces' photographic laboratory, is larger in size and greater in focal length than even the Big Bertha used in the Bikini atomic bomb tests. It will provide 9x18-inch pictures with two and a half times more photographic detail from altitudes up to 10 miles than can be obtained with the best of the older standard cameras now in use.

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CHEMISTRY

Improved Cellulose Gum Is Produced for Many Uses

➤ IMPROVED water-soluble cellulose gum, with hundreds of manufacturing uses ranging from tooth paste and paints to chinaware and rubber, enters commercial production in a new plant of the Hercules Powder Company.

Cellulose gum is not a new product; it has been made in Europe for many years where it is known as sodium cellulose glycolate. Little, however, has been made in America until now, but it will become plentiful as a result of processes developed by Hercules.

The new Hercules cellulose gum will be known as CMC. It is the sodium salt of carboxymethyl-cellulose formed by the reaction of monochloroacetic acid with alkali cellulose. It is adhesive but not sticky. It is insoluble in organic solvents; it not only acts as an emulsifying agent in oil-in-water emulsions, but also protects the emulsion.

Science News Letter, November 30, 1946

CHEMISTRY

Plastic Coating Makes Fabrics Easy to Clean

➤ HOUSEWIVES will welcome new table covers that can be cleaned on the table with a damp cloth. Office girls will rejoice in a half-pound raincoat that can be tucked away in a corner of their handbag. Both, to be available soon, use a tough and flexible plastic, called vinyl butyral, made by the Monsanto Chemical Company.

The plastic is not a new material. For ten years it has served as an interlayer material for safety glass. Its application as a coating to textiles, however, is new. It affords water and stain resistance without impairing the fabric's original appearance, feel and utility to any measurable extent. It can be applied to most fabrics other than ordinary wearing apparel. The raincoat is made of combined nylon and the vinyl butyral.

The fabric coating applied is a super-thin layer of tightly adhering transparent plastic, doctored with sub-microscopic particles to scatter light rays. It will not chip or peel under normal usage, and is relatively unaffected by heat.

While the treated surface can be kept clean with a damp cloth, the fabric itself may need occasional laundering.

Science News Letter, November 30, 1946

ASTRONOMY

Saturn in Evening Sky

Most brilliant December display is seen in east, where Sirius is the brightest star in the night sky, in constellation of Canis Major, the great dog.

By JAMES STOKLEY

➤ SATURN alone of the planets is visible in the evening during December, joining the brilliant winter stars which are now swinging into view. The positions occupied by these objects, as they appear at 10 p.m. on Dec. 1 and about 9 p.m. at the middle of the month, are shown on the accompanying charts.

It is to the east that we see the brightest display, and of these the most conspicuous of all is the star Sirius, most brilliant that we see in the night-time sky. It is in the constellation of Canis Major, the great dog, low in the south-east. Just above it is the outstanding constellation of Orion, the warrior, marked by two stars of the first magnitude, Betelgeuse and Rigel. Between them is a very prominent row of three slightly fainter stars which mark the warrior's belt.

Above and to the right of Orion is Taurus, the bull, with a V-shaped group of stars (the Hyades) marking the animal's face. In this is Aldebaran, red in color, indicating his eye. Above and to the left of Orion are the heavenly twins, Gemini, with the two bright stars Castor and Pollux. Below them is our evening planet, Saturn, and a little farther to the right is Procyon, in Canis Minor, the lesser dog. Above Gemini is Auriga, the charioteer, in which bright Capella shines.

Bright Area

In the area of the sky occupied by these constellations there are more bright stars than any other of similar size. It is because they happen to be above the horizon in the evening at this time of year that the winter evening skies are so much more brilliant than those of summer, and not for any greater clarity of the atmosphere, as many people seem to believe.

However, there are other bright stars, too. Low in the northwest Vega is indicated, but this is so low that its full brilliance cannot be appreciated. Actually it is second only in brightness to Sirius. Just above Vega, which is part of

Lyra, the lyre, is Cygnus, the swan, of which the star Deneb is a member.

In the west we can see another familiar figure, the so-called "Great Square of Pegasus." However, the four stars which form a very good square are not all in the constellation of Pegasus, the winged horse. The one in the uppermost corner is Alpheratz, in Andromeda, who was the princess that was chained to the rock in the old mythological tale. Close to Andromeda is Cassiopeia, her mother, represented by an M-shaped constellation.

Only Saturn Visible

Though only Saturn is now visible in the evening, three other planets may be seen in the early morning hours, before sunrise. Brightest by far is Venus, in the constellation of Libra, the scales, which rises in the southeast about three hours before the sun. Close to it in the same constellation and fainter, though still exceeding any other planet or star, is Jupiter. Also this month, on the ninth, Mercury reaches its farthest west of the sun, and then for a few days it can be glimpsed low in the southeast as dawn is breaking.

December also brings a total eclipse of the moon, but not to the United States. This comes on the eighth when the moon enters the shadow of the earth. It will be seen from Alaska, most of the Pacific Ocean, Australia, New Zealand,

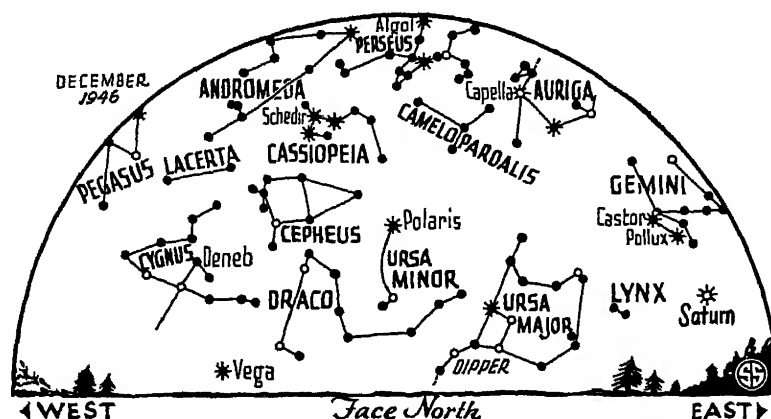
Asia, Africa and most of Europe.

Dec. 14 is important astronomically, especially this year, for 400 years ago on that date there was born one of the greatest—as well as the most colorful—astronomers of all time. This was Tycho Brahe, a Danish nobleman whose labors paved the way for the work of Kepler and Newton in later years. Since he was born in 1546, before Pope Gregory reformed the Calendar in 1582 and dropped 10 days, Dec. 24 will actually be four even centuries after Tycho's birth.

This event occurred in Knudstrup, in the present Swedish province of Skane, which was then Danish. Tycho studied at the Universities of Copenhagen and Leipzig, and was unfortunate enough to have the end of his nose sliced off in a student duel. Thereafter he always wore an artificial one of brass! The traditional pursuits of his noble family were diplomacy and statecraft, but he became interested in mathematics and astronomy. This interest was stimulated in 1572 when a "new star" flashed out in the constellation of Cassiopeia. He studied it and published a book on it in 1573.

Royal Support

Though there was prejudice against a nobleman engaging in such activities, he soon became known as a great astronomer and by 1576 the Danish king, Frederick II, gave him the island of Hveen, in the sound between Denmark and Sweden, and erected a great observatory for him there. The island is not far from Elsinore, scene of Hamlet's



tragedy. In fact, one can stand on the battlements of Elsinore, where Hamlet is supposed to have met his father's ghost, and see Hven, as it is now called, to the south.

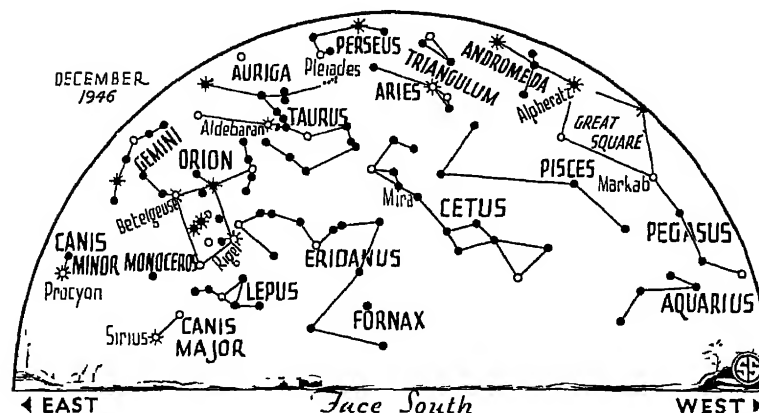
Tycho called his observatory Uraniborg—city of the heavens. Though this was prior to the invention of the telescope, it was here that modern observational astronomy really began, for the instruments that he designed and built were the most accurate that had ever been made and he knew how to use them to secure the greatest precision.

A great comet appeared in 1577 which he observed and showed that it was not in our own atmosphere, as people thought such objects to be. He demonstrated that it was more distant than the moon, and so definitely placed these visitors among the celestial objects. At Uraniborg he had his own printing plant, and from here his results were spread among learned men in all countries.

Support Continued

Even after the death of Frederick II in 1588 royal support continued. The next ruler was Christian IV, who was only 11 when crowned, so a regency ruled until he was 20. One of the regents was a good friend of Tycho's and realized the importance of his work, so the fame of Uraniborg still spread. In 1590 King James VI of Scotland, who later was James I of England, paid him a visit. But in 1594 Tycho's friend died, and when the young king began to rule in his own right Tycho's pension ceased. In the spring of 1597 he left, taking his instruments with him.

Today on Hven, which is Swedish, there is nothing left of the buildings which Tycho built, though the cellars remain, like a sunken garden, and the well which supplied running water to the house, is still there. Nearby is a small museum, erected about a dozen



◐ ◑ ◒ ◓ SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

years ago, to house some of the stones of the building which have been recovered, and a few other relics.

From Hven, Tycho and his retinue first went to Copenhagen, but in June they moved on to Rostock, in Germany. In October he went to the Castle of Wandsbeck, near Hamburg, where he finished and printed with his own presses, which he had brought along, his great work describing the instruments he had used at Uraniborg. Next his wanderings took him to Dresden, and thence to Wittenberg. Finally, in 1599, he went to Prague, where he found the protection of the Emperor Rudolph II.

He was given a castle about 22 miles from the city, where he re-erected his instruments. It seemed as if his great

work might continue, but he died in October, 1601, a little less than 55 years of age. On order of the Emperor he was given an elaborate funeral and was buried in the Teynkirche, in Prague, where his tomb may still be seen.

During his brief activity in Prague, however, students and scholars came to him. Among them was the young German astronomer, Johann Kepler, whose work had already won him renown and had brought an invitation from Tycho to join him "not as a guest but as a dear friend and colleague." Thus it was that Kepler fell heir to Tycho's observational data, a most happy circumstance. As a skillful observer, Tycho probably never had a superior; Kepler, on the other hand, was a brilliant (See next page)

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(No. 1)

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—James A. Reyniers, Philip C. Trexler and Robert F. Ervin

Germ-Free Life Applied to Nutrition Studies

—James A. Reyniers

Approximately 130 pages, 7" x 9"

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Do You Know?

Potted *orange plants* often have a black coloration due to a sooty mold which is growing on sweet material exuded by scale insects.

One-fourth of all *patents* registered in the United States Patent Office relate to automobiles.

Curare, the arrow tip poison used by some primitive people, is now employed in the treatment of infantile paralysis.

From page 347

mathematician, though poor eyesight made observational astronomy a difficult task. But Kepler's analysis of Tycho's data led to the former's great laws describing the movements of the planets, and these in turn were generalized by Newton in his theory of gravitation. Thus it is that the name of Tycho Brahe ranks among the first half dozen or so of the greatest astronomers of all time, and this December learned societies throughout the world are commemorating the Four Hundredth Anniversary of his birth.

Celestial Time Table for December

| Dec | EST | |
|-----|------------|---|
| 1 | 4:47 p.m. | Moon in first quarter |
| 8 | 12:52 p.m. | Full moon (total eclipse of moon visible in Eastern Hemisphere) |
| | 7.00 p.m. | Moon nearest, distance 221,600 miles |
| 9 | 4.00 a.m. | Mercury farthest west of sun |
| 11 | 10 56 p.m. | Moon passes Saturn |
| 12 | early a.m. | Meteors of Geminid shower visible |
| | 4 00 a.m. | Planet Uranus nearest, 1,688,000,000 miles |
| 15 | 5:57 a.m. | Moon in last quarter |
| 17 | 2:34 a.m. | Algol (variable star in Perseus) at minimum |
| 19 | 4:07 p.m. | Moon passes Jupiter |
| | 8.40 p.m. | Moon passes Venus |
| | 11 23 p.m. | Algol at minimum |
| 22 | 5 54 a.m. | Sun farthest south, winter begins |
| | 7 00 p.m. | Moon farthest, distance 252,600 miles |
| | 8:12 p.m. | Algol at minimum |
| 23 | 8 06 a.m. | New moon |
| | 3:00 p.m. | Venus at greatest brilliancy |
| 25 | 5:01 p.m. | Algol at minimum |
| 31 | 7 23 a.m. | Moon in first quarter |

Subtract one hour for CST, two hours for MST, and three for PST

Science News Letter, November 30, 1946

THE CHEMICAL ELEMENTS

Compiled by
PHILIP S. CHEN, Ph. D.
PROFESSOR OF CHEMISTRY, ATLANTIC UNION COLLEGE

WALL CHART

(Actual Size 38 x 50 inches)

**CONTAINS THE FOLLOWING
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CONCERNING EACH ELEMENT**

Periodic table (based on atomic weights)
Group and family
Name in English, German, and French
Derivation
Discovery Date, discoverer, nationality
Symbol and atomic number
Arrangement of electrons in orbits
Atomic weight
Logarithm of atomic weight
Isotopes and valence
Crystalline form and color
Melting and boiling points
Specific heat

Heats of vaporization and fusion
Heat conductivity
Electrical conductivity
Coefficient of thermal expansion
Occurrence, preparation, and uses
The radioactive elements
Activity series
Distribution in earth crust, in ocean, in atmosphere, and in human body
Mechanical properties of principal metals
Map showing production in U.S.A.
Alchemical symbols
Critical constants for gaseous elements
Flame and color tests
Index to the elements

The chart is so self explanatory that a key, which is usually necessary for other charts is not necessary for its intelligent use. Numerical values are given for constants that are represented in other charts by signs and varying length of lines or columns.

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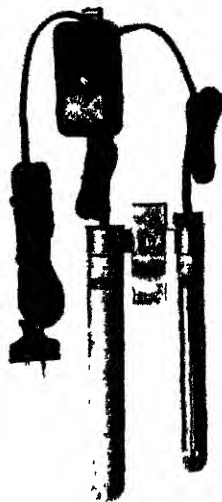
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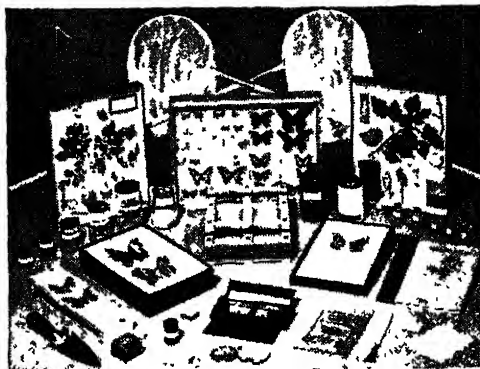
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Still Unimitated

► **AMBITIOUS** dreamers of human flight, from Leonardo da Vinci to the Wright brothers, studied closely the flight of birds, and at long last profited thereby. A modern airplane is like a bird at least to the extent of putting a streamlined covering over the irregular surfaces of its power sources, as a bird streamlines its rather awkward-looking body with smooth feathers.

Some of our newer high-speed planes seem to have been modeled on the lines of a hawk-moth rather than those of a bird. They have the same fineness of fuselage, the same trim and taper wings as those hovering, long-tongued twilight visitants to summer flower-gardens.

However, if an airplane designer were able not only to copy the hawk-moth's smooth lines, but to imitate even a part of the things a hawk-moth can do in flight, he would have trouble taking home all the medals and prizes that would be heaped on him.

The hawk-moth is not only capable of swift, darting forward flight; it can fly backwards, dodge sideways, stop abruptly in mid-flight and hover motionless in the air. It can rise or drop ab-

ruptly while hovering, swoop with equal abruptness while in flight. In all these marvelous skills it closely resembles the hummingbird, for which it is sometimes mistaken by those who are not close observers.

Add to this the fact that this insect's wonder-wings are also its only propellers!

It is only lately that scientists have been able to get an adequate idea of how an insect uses its wings in flight.

Close watchers with good eyes were able to catch the principal movements of a bird's wings: Leonardo's notebooks are full of sketches showing how carefully he watched the birds he strove to imitate. But the many-fold more rapid beats of an insect's wings defied study until the recent invention of ultra-high-speed motion-picture cameras capable of making thousands of exposures a second. Now we know how an insect flies—but we are still unable to imitate its art.

Science News Letter, November 30, 1946

Books of the Week

ALL BUT ME AND THREE Psychiatry at the Foxhole Level—Brig Gen Elliot D. Cooke—*Infantry Journal*, 215 p., \$2.75. A non-medical report to General Marshall on the author's study of the problem of psychiatric cases in the Army and what was done about them.

ELEMENTS OF PUBLIC ADMINISTRATION—Fritz Morstein Marx, Ed.—*Prentice-Hall*—637 p., \$6.65. The administrative process as an integral phase of contemporary civilization is discussed by 14 experts deeply interested in this work.

FLIGHT TESTING CONVENTIONAL AND JET-PROPELLED AIRPLANES—Benson Hamlin—*Macmillan*, 147 p., illus., \$5. This book provides the first complete standardization of methods of the analysis of flight test information, and makes available the author's systematized study of flight testing developed during the war, together with considerable new material on turbo-jet-propelled aircraft.

HANDBOOK OF CHEMISTRY—Norbert Adolph Lange, Ed.—*Handbook Publishers, Inc.*, 1767 p.; appendix, 269 p., and index, \$7. Contains essential fact-finding, time-saving chemical tables, formulas and other data for students and teachers of chemistry, physics and chemical engineering. Appendix carries mathematical tables and formulas. Sixth edition revised.

HATCHERY MANAGEMENT—Roland C. Hartman and G. S. Vickers—*Judd*, 404 p., illus., \$4. This revision of the 1932 edition gives considerable material on flock improvement, incubation, hatchery sanitation, advertising and selling.

HOW CAN WE TEACH ABOUT SEX—Benjamin C. Gruenberg—*Public Affairs Committee*, Pamphlet No. 122, 32 p., illus., paper, 10 cents. Several important "don'ts" in sex education are listed for schools, parents and groups endeavoring to guide people in this important field.

AN INTRODUCTION TO MATHEMATICAL GENETICS—Lancelot Hogben—*Norton*, 260 p., tables, ratios and formulas, appendices, \$5. This book, the first of its kind, aims to make mathematical genetics intelligible to readers and students who need assistance before they can consult original sources.

PAPAGO INDIAN RELIGION—Ruth M. Underhill—*Columbia University Press*, 359 p., \$4.50. A scholarly and understanding discussion of rites and beliefs of the Papago Indians of the Arizona reservations,

and a sequel to the author's *Social Organization of the Papago Indians*.

PENICILLIN—Its Practical Application—Alexander Fleming—*Blakiston*, 380 p., illus., \$7. New, authentic, practical, this book tells the general practitioner and surgeon how to use penicillin for best results. Twenty-eight specialists working under the editorial supervision of Dr. Fleming present the latest details as to dosage, forms and methods of administration, prophylactic uses, control, etc.

PLASTICS BUSINESS—Herbert R. Simonds and Joseph V. Sherman—*Van Nostrand*, 439 p., illus., \$5. Here is the first comprehensive survey of the plastics industry analyzing its structure and its trends. It covers the organization of the industry, its growth and development, and gives intimate statistics from individual companies to serve as a guide.

THE PRACTICE OF SEX EDUCATION—Dr. Eustace Chesser and Zoe Dawe—*Roy*, 227 p., diagrs., \$3. A plain guide for parents, teachers and young leaders who desire to help in this deeply important field.

SILICONES: FOOD FOR IMAGINATION—R. R. McGregor—*Mellon Institute of Industrial Research*, 10 p., illus., paper, free. One of the newest classes of plastics developed during the war was the silicones, and this pamphlet outlines the constitution and behavior of these new materials.

THE SOUTH AMERICAN HANDBOOK, 1946—Howell Davies, Ed.—*Trade and Travel Publications, Ltd.*, H. W. Wilson, 810 p., 23d edition, \$1.25. A standard guide to 23 countries, including Cuba and the Falkland Islands, giving information on history, climate, flora, fauna, resources, government, transportation, monetary and other standards, where to go, what to see, hotels and living costs.

USE OF AUDIO-VISUAL MATERIALS TOWARD INTERNATIONAL UNDERSTANDING—Helen Seaton Preston, Ed.—*American Council on Education*, 168 p., paper, \$1.25. Report of conference sponsored jointly by the American Council on Education and the Film Council of America, June 14-15, 1946.

WHITE CAPS, The Story of Nursing—Victor Robinson—*Lippincott*, 425 p., illus., \$3.75. A factual, thrilling story of nursing from its start under a thatched roof to the tremendous hospitals and laboratories of today.

Science News Letter, November 30, 1946

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Science News Letter, November 30, 1946

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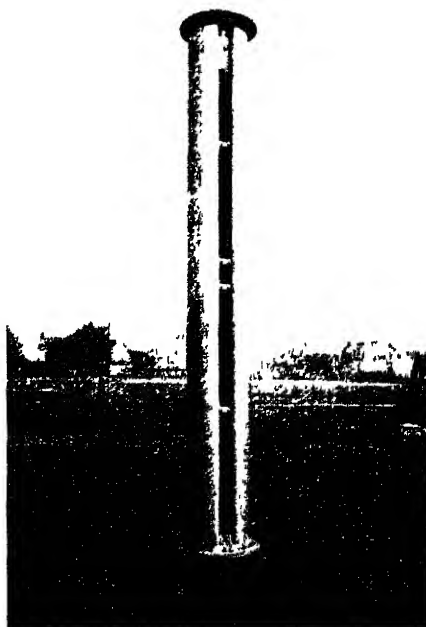
Science News Letter, November 30, 1946

☼ **WALKING-TREADS** for ice skates, just patented, are quickly attached with a thumb-nut that grasps the center of the skate blade. The blade fits into a central slot on the upper side of the tread, which has a curved lower surface to facilitate walking when off the ice.

Science News Letter, November 30, 1946

☼ **VACUUM CLEANER**, small enough to be kept in the glove compartment of an automobile, operates off the engine manifold vacuum when the car engine is run at idling speed. Connections are long enough to permit the use of the cleaner in any part of the car's interior.

Science News Letter, November 30, 1946



☼ **CYLINDRICAL** antenna, a new FM radiator or transmitter, is made of 13-foot units that are 19 inches in diameter, with a narrow slot from top to bottom, as shown in the picture. The cylindrical structure itself is the radiator. The feed line, a single transmission line, runs up the inside along the slot.

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☼ **SYNTHETIC** adhesive, a thermoplastic composition that does not require vulcanization to obtain adhesive strength,

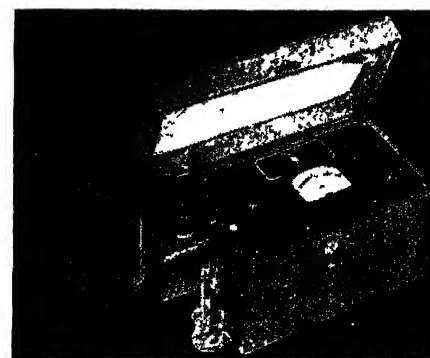
is suitable for bonding Buna-N type synthetic rubbers and vinyl films to rigid surfaces of steel, aluminum, glass, wood or concrete. This cold-setting material dries completely within two hours.

Science News Letter, November 30, 1946

☼ **LABORATORY** tongs, to handle hot flasks, beakers and evaporating dishes, have jaws of two parallel wires so curved that they can be used safely to hold glass, ceramic or platinum wares while pouring out the contents. Made of aluminum rod, the handles are large for easy grasping.

Science News Letter, November 30, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 339. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.



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Question Box

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SCIENCE NEWS LETTER



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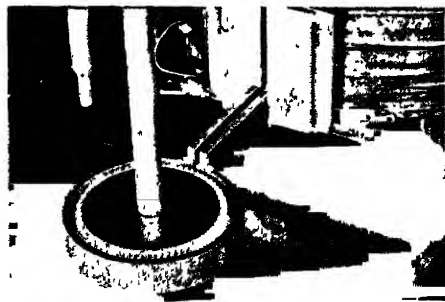
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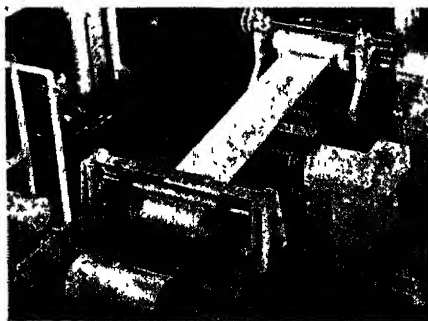
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INDUCTION HEATING is ideal for hardening of gears (see above), contour hardening, brazing, soft soldering and annealing.



DURING THE WAR Westinghouse research engineers pioneered induction heating equipment for *reflowing tin* on electrolytic tin plate. Result *one* pound of tin now does the work of *12-15*.



DIELECTRIC HEATING has many advantages over conventional heating in bonding plywood (see above), molding plastic preforms, textile processing—and curing plastic laminates—rubber, etc.

MEDICINE

Atom Defense-3,000 MDs

Only a few men and women are prepared to give medical defense against the dropping of atom bombs. Army and Navy may give them special training.

➤ A THIN LINE of at most 3,000 men constitutes our first line of medical defense against atom bombs if any nation uses them against us. These 3,000 are the men and women physicians in the United States specializing in X-ray and radium work.

They are the ones who will be responsible for determining which buildings, which food, water and milk supplies and even where the air is safe from deadly doses of radioactivity dispersed by a bomb explosion.

Those of them attending the meeting of the Radiological Society of North America in Chicago were told by Dr. Stafford Warren of the University of Rochester, formerly of the Manhattan Project medical division, that next spring or summer they will hear from the Army and Navy of plans to give them special training for the job they will have in the next war, if one comes.

Radioactivity equivalent to that from several thousand pounds of radium was released by the underwater explosion at Bikini, Dr. Warren reported. He was not allowed to reveal the exact amount as that is still a military secret.

The approximate figures were frightening enough to the radiologists accustomed to using utmost care in handling radium in microgram amounts. Micrograms are millionths of a gram, a gram itself being about one-thirtieth of an ounce.

Ernest Rutherford

Imperial Agricultural Research Institute

MEDICINE

X-Rays Endanger Women

➤ WOMEN NEED greater protection than men from radiation, whether they are atomic energy workers, or nurses and technicians helping give radium and X-ray treatments, or girls in candy factories using X-rays to check candy boxes.

Warning to this effect was given by Dr. Egon Lorenz, National Cancer Institute biophysicist, at the meeting of the Radiological Society of North America.

His warning was based on studies

Contamination with deadly radioactivity was not a problem in the case of the bombs dropped over Japan because the deadly fission products rapidly rose to the stratosphere. Following the underwater explosion at Bikini, a black rain of radioactive material fell, and a mist of the same deadly stuff was carried for miles by the wind.

Explosion of a few atom bombs under the water of any of the Great Lakes would make uninhabitable not only Chicago, Cleveland, Buffalo and other lake cities but others miles away. All inhabitants of the cities who escaped immediate death would suffer the fate of the radium watch dial workers in the last war who died of cancer from the minute amounts of radium that got into their bones.

Detecting material contaminated with radioactivity is only one part of the vast job facing our medical defense workers, Dr. Warren pointed out. Once the material is detected, a safe way of disposing of it must be found. It cannot be dumped into the sewers because that would endanger people many miles away whose water supply comes from the rivers into which the sewers drain. And there will be tons and tons of such deadly material to dispose of if an atom bomb or two are exploded under water near only one of our harbor cities.

Science News Letter, December 14, 1946



ATOMIC PILE—Operators place a sample for irradiation on a stringer which will be pushed into the chain reacting pile at the Argonne National Laboratory.

The "permissible dose" of radiation now considered safe for workers is one-tenth Roentgen per eight-hour working day.

A shortening of the life span which Dr. Lorenz termed "unimportant" might "perhaps" result from this dosage, the mice studies showed. Such a dose, however, even over long periods of time, will not have cancer-causing effects except in the case of women.

Damage to the future children of persons exposed to this dosage probably will not occur. Dr. Lorenz said the present permissible dose gives a sufficiently wide margin of safety that "visible mutations will not occur."

No visible mutations indicating damage from the radiation appeared in breeding experiments and continuous breeding of mice up to six generations under exposure. About 12,000 mice were used in this experiment.

A possible unknown factor in connection with slow neutrons that might injure atomic bomb workers was suspected during the early days of the Manhattan Project. This worry to the medical scientists responsible for health protection turned out to be unfounded, Dr. Raymond E. Zirkle of the University of Chicago reported. Practically all the damage that slow neutrons could do can be accounted for in terms of physical and biological events already known before

work on the atom bomb started and against which the workers were protected.

"Present or prospective workers in the new field of atomic energy should be caused no anxiety," Dr. Paul S. Hen-

shaw, of the Clinton laboratories, declared reassuringly.

The exposure to radiations required to induce cancer in animals, he reported, is far above the permissible levels allowed Manhattan Project workers.

Science News Letter, December 14, 1946

MEDICINE

Uranium Toxic to Body

► URANIUM poisoning of the kidney is a hazard facing atomic power workers unless suitable precautions are taken.

The chemical toxicity of uranium is a greater danger than the radiation hazard of the element itself before fission. The public has heard little of this chemical hazard but it was given full attention by the group protecting the health of the atom bomb workers, Dr. Andrew H. Dowdy, radiology professor and Manhattan department director at the University of Rochester, reports.

One of their first problems was to devise a reliable method for detecting uranium in very small quantities. One part of uranium in 10,000,000 parts of animal tissue, blood or urine can be accurately measured by the method they developed, Prof. Dowdy reported to the American Public Health Association. Its presence can be detected in such small amounts as 1/2,000,000,000 of a gram.

A gram is about a thirtieth of an ounce.

The poisonousness of uranium varies to a certain degree, though not entirely, with the solubility of the compounds. These may be found in the form of dusts or gases.

Many of the uranium compounds may be absorbed into the body through the skin, by way of the lungs or from the stomach and intestines by being swallowed.

Protection against uranium poisoning consists in completely closed systems, adequate ventilation systems to evacuate harmful agents from the atmosphere, gas masks, and special procedures for laundering the work clothing of plant personnel.

Personal hygiene and rigid medical supervision to detect small amounts of harmful substances in the excreta of personnel are important for health protection.

Science News Letter, December 14, 1946

PLANT PATHOLOGY

Fungus Ate 1946 Tomatoes

► THE SAME DEADLY fungus that caused famine in Ireland a hundred years ago by wiping out the potato crop will make canned tomatoes and tomato juice harder to find this winter at your grocery store.

An unexpected attack of the late blight of tomato sneaked up on American tomato fields this year just as they were about to produce a bumper crop of red fruits for canning and juice. It caused losses as high as nine-tenths of the potential yield in some commercial fields, and diminished the returns by half or more in eight eastern seaboard states. This is another strain of the death-dealing blight that visited Ireland a century ago.

A United States Department of Agriculture survey of the lost battle against the tomato late blight this year shows that the heaviest damage was concen-

trated in the chain of states along the Atlantic Coast from Virginia to Florida, together with Pennsylvania, Delaware and Rhode Island. In these states, more than half the potential crop was lost.

The deadly fungus, *Phytophthora infestans*, has damaged potatoes in this country as well as causing the common late blight and tuber rot in Irish potatoes. But where it attacks potatoes, it frequently does little or no damage to neighboring tomatoes. It takes seven successive generations of the potato menace for it to develop into the tomato late blight.

A generation requires a minimum of three days from the time the potato late blight has infected the tomato leaf or fruit, a lesion has been formed and spores have been produced. Favorable weather, cool wet nights and warm days, for 21 successive days are necessary for

the blight to become the tomato-attacking strain.

One reason for the wholesale losses in this year's tomato crop was lack of equipment for spraying and dusting the fields with fungicides. As a desperate resort, airplane dusting was tried on a number of fields, but little success was reported.

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Brazil is forging ahead in rice production, its 1946 crop, harvested from March to May, is about 115,000,000 bushels, against 103,000,000 bushels the previous year and far more than in pre-war years.

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GENERAL SCIENCE

**Noted German Scientists
Work for Uncle Sam**

➤ IN ADDITION to the 270 German and Austrian technical experts recently revealed to be working in this country under the War Department, more are known to be in Navy custody, but their number and the nature of their work has not been released.

Army plans call for increasing the number to approximately 1,000, in the program which got underway on an experimental basis in September, 1945. Some of these alien scientists have been granted the right to apply for immigration visas and may eventually become American citizens.

Included among the "big name" scientists revealed to be in this country are Dr. Alexander W. Lippisch, former chief designer of the Messerschmidt Aircraft Co.; Wernher von Braun, credited with inventing the V-2 rocket; Dr. Friedrich Doblhoff, Vienna, designer of the world's first jet-propelled helicopter; and Dr. Helmuth Heinrich, formerly of the Graf Zeppelin Research Institute. German rocket experts are working at Fort Bliss, Tex., and nearby White Sands, N. Mex., where U. S. Army Ordnance is firing V-2's to gather scientific data. Another group of the Germans is stationed at Wright Field, Ohio, where the Army Air Forces have a large research and development center.

Many of the scientists brought publications and notes which may prove important contributions to American science and industry, the Army said.

Science News Letter, December 14, 1946

ZOOLOGY

**Oscar Made His Fortune;
Estate Finally Killed Him**

➤ OSCAR, pet seal of the California Academy of Sciences, used to dive for pennies. Having no pockets in his seal-skin coat, he swallowed them. That was where he made his fatal mistake.

One morning he was found dead on the floor of his pool. Autopsy disclosed that he had nearly four pounds of coins in his stomach, mostly pennies. These included a good many of the wartime "white pennies" which contained zinc, suspected of being poisonous.

Cash value of Oscar's "estate" was \$754. It was donated to the San Francisco Children's Hospital.

Science News Letter, December 14, 1946



WORKING FOR U. S.—A German scientist, Dr. Helmuth Heinrich, demonstrates an unconventional type parachute in the vertical wind tunnel at Wright Field, Ohio. U. S. Army Air Forces photo.

PHYSIOLOGY

Growth Fluid Synthesized

Chick embryo tissue cultures live in first solutions of known chemical composition. Research may lead to knowledge of tissue differences.

➤ FRAGMENTS of embryo chick heart tissue have been kept alive and pulsing for as much as six weeks in a solution of exactly known chemical composition, Dr. Philip R. White of the Institute for Cancer Research, Philadelphia, announced in a lecture before the New York Academy of Sciences. Other embryo tissues have been maintained in growing condition for somewhat longer periods.

This represents the first step towards growing animal tissues indefinitely under fully known and controllable conditions, something that has already been accomplished on plant tissues by Dr. White and several other workers.

The "immortal" chick heart cultures, with which the name of the late Dr. Alexis Carrel has been popularly associated, were grown in fluids taken from animal bodies. Since the makeup of these fluids is very imperfectly known, important details of the biochemistry of

growth must also remain unknown.

It is the determination of Dr. White and his co-workers to duplicate with animal tissues the success they have already had in plant tissues, thereby opening the road toward better knowledge of all growth processes, including the malignant ones that produce cancers.

The nutrient solution used in Dr. White's laboratories contains dextrose, several mineral salts, 11 vitamins and 12 amino acids. He stated candidly that "this is a shotgun mixture which will have to be studied in more detail, which can probably be simplified, and may ultimately need to be enlarged."

One of the things that should be possible, once a really successful animal tissue culture fluid has been developed, capable of sustaining life and growth indefinitely, is a study of the basic biochemical differences between normal and cancerous tissue.

Science News Letter, December 14, 1946



PINE CLUSTER—Each pine cone is normal except for its miniature size.

BOTANY

Clump of Cones Found on Pine Tree

➤ MASS OF 208 pine cones, each bearing seed and normal in every way, except for their miniature size, was found growing on a tree in the vicinity of Plymouth, Mass. Each of the six branches that make up the second whorl from the top of the pitch pine tree was completely clothed with cones for a length of six inches or more. Picture by Edwin F. Steffek of the Massachusetts Horticultural Society.

Science News Letter, December 14, 1946

INVENTION

African Inventor Offers Solution to Parking Problem

➤ AFRICA CAN'T BE as vast a continent as the traveloguers used to tell us; it seems to have developed a parking problem. At any rate, a South African inventor, Martin Rickland of Durban, Natal, comes up with a new kind of parking building, on which he has just received U. S. patent 2,412,009.

Cars as they enter are put on platforms like huge trays. These are carried up to any desired level on an elevator. Then they are slid off onto their designated floors, as trays of crockery might be put on shelves. Double sets of rollers underneath facilitate the sliding job.

Science News Letter, December 14, 1946

OPTICS

Equipment Extends Vision

➤ A NEW MICROSCOPE that extends the range of human vision and is particularly useful in the study of transparent tissues is being made available by the American Optical Company's Scientific Instrument Division.

A special plate introduced into the objective lens system brings out details otherwise unseen by making the specimen lighter or darker than its surroundings. Transparent living organisms can thus be studied without staining with dyes, a procedure that kills most organisms.

Many significant experiments can now be made in biology and the effects fully studied with the new instrument. Tiny chambers, for example, can be constructed on microscope slides to imprison living organisms. These chambers can be utilized to supply nutrients and oxygen, and to remove toxic excretions. Thus the effect on the organisms of many agents, including drugs and vitamins, can be investigated.

Crystals, otherwise barely visible, can be seen with the phase microscope. Regions within certain substances can be made invisible, facilitating the discovery of impurities.

A diaphragm for controlling light concentrated on a specimen and one of the new diffraction plates placed in the objective lens system transform a standard light microscope into a phase microscope. An auxiliary telescope used in place of

the microscope eyepiece helps center the equipment.

The specimen is first illuminated by a hollow cone of light and a diffraction plate inserted within the microscope objective. Depending on the kind of diffraction plate, any regions within the specimen of different optical path can be made bright on a dark background, or dark on a light background. The invisible phase differences of the light passing through a transparent specimen are converted into differences in light intensity to which the eye is sensitive.

The equipment will be made available for several models of the company's Spencer microscopes. During the last few years a few lucky scientists had their microscopes adapted for study of specific specimens. Different types of the newly-developed diffraction plates were found preferable for various kinds of investigations.

Research conducted by A. H. Bennett, research director of the division, Drs. Harold Osterberg, Helen Jupnik and Oscar W. Richards have made possible the manufacture of phase microscopes in this country. Microscopes of this type were first described about a decade ago by the Dutch scientist F. Zernike. Two phase microscopes were brought back as scientific booty of war from Jena, Germany. They were developed independently by scientists of the Zeiss Optical Works (*See SNL, June 22, 1946.*)

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MEDICINE

Eye-Bank Aids Seeing

➤ HUNDREDS OF PERSONS are now wearing living eyes that do not belong to them by birth. Altogether probably some 1,500 persons have had this experience since the first corneal transplant or eye grafting operation was performed about 100 years ago, Dr. Herbert Katzin, head of the Eye-Bank's laboratory in New York, estimates.

In order to give more persons this chance to see through eye tissues from other eyes when their own fail, the Eye-Bank is giving training, through fellowships, to eye surgeons from other parts of the country. Dr. Katzin reported to the National Society for the Prevention of Blindness meeting.

They perfect their skill through op-

erating on rabbits' eyes. This is even more difficult than operating on human eyes, for one thing because the rabbit's cornea is thinner and tears more easily than human corneas. The bunnies will not lie quietly in bed after the operation, which leads to complications more often than in human corneal grafting operations.

Methods of preserving eyes until they can be used, the usefulness of eyes removed because of disease and determining the suitability of a patient's eye for the grafting operation are among the problems the Eye-Bank is studying in efforts to extend this sight-preserving procedure.

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MEDICINE

Gland Role in Mental Ills

Adrenal hormone discovery may lead to more successful treatment of mental sickness if further research reveals the relation between glands and emotional stress.

➤ A GLAND DISCOVERY that gives a new lead to the mental disease problem is announced by Dr. Hudson Hoagland, Dr. Gregory Pincus and Fred Elmadjian of the Worcester Foundation for Experimental Biology.

In the mentally sick, the Worcester group finds, the adrenal glands respond to stress in a way strikingly different from their response to stress in normal persons. The adrenals are small organs that sit like cocked hats one atop each kidney. They produce two hormones, epinephrine, also called adrenalin, and cortin. The cortin-producing part of the gland, which is not under nervous control, is the part that responds differently under stress.

A count of certain white blood cells called lymphocytes gives one measure of the activity of the cortin-producing part of the adrenals. In normal persons, operation of a pursuitmeter under simulated high altitude flying conditions may drop the lymphocytes 40%. A rise of like amount on the average occurs in mentally sick patients when operating the pursuitmeter under the same conditions. The amount of stress this operation involves has been called by Army pilots as tiring as close formation flying under poor weather conditions.

The mentally sick are persons who have broken psychologically under the stresses of life. It now appears that the functioning of certain glands in the mentally sick is inadequate to meet stress situations. Whether the gland failure is responsible for the mental sickness has not yet been determined, but scientists have long been searching for such a physiological failure to explain the psychological break.

More successful treatment of mental sickness might follow the important lead which the Worcester discovery gives. At present the scientists are trying to localize the mechanism responsible for the gland failure. It may be in any of three places: 1. the outer part, or cortex of the adrenal gland which produces cortin; 2. the pituitary gland in the head which normally stimulates the adrenal glands to produce cortin; 3. the hypothalamus in the base of the brain which

controls the pituitary gland. Since the hypothalamus is intimately related to emotional life, a defect in it could have widespread repercussions in both the psychology and physiology of the patient.

Science News Letter, December 14, 1946

GENERAL SCIENCE

Only Two U. S. Delegates To UNESCO Are Scientists

➤ ONLY TWO of the 45 U. S. delegates and counsellors at the United Nations Educational, Scientific and Cultural Organization general conference in Paris are representatives of the natural sciences. They are Dr. Arthur H. Compton, chancellor of Washington University, St. Louis, and Dr. W. Albert Noyes, president-elect of the American Chemical Society.

This small proportion compares unfavorably with the proportion of scientists in other delegations. France, for example, has seven scientists among the 35 members of her delegation, and Australia has three out of 10.

In fact, it may be said that among the more important countries represented, the U. S. has the lowest representation of science of any delegation.

In view of the great weight which the U. S. delegation's views carry in the councils of UNESCO, it is feared that this may adversely affect some of the scientific projects now before the conference.

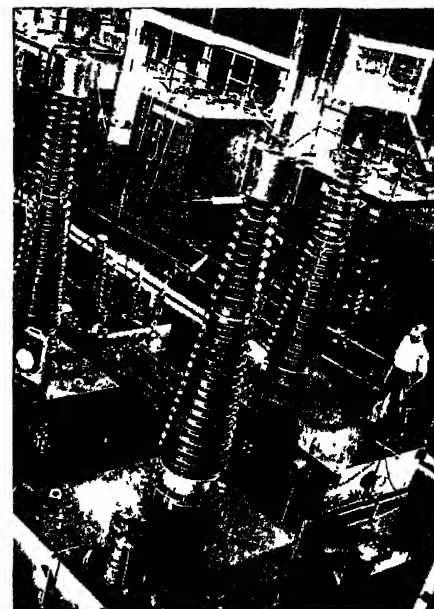
Science News Letter, December 14, 1946

INDUSTRY

Batteries Are Scarce Because of Lead Shortage

➤ THERE IS A HARD winter ahead for automobile owners whose cars need new batteries. The shortage of batteries is due to a shortage of lead, and little relief is expected in the next few months.

The United States is one of the world's greater lead-producing nations but even in the lush production years two decades ago did not mine enough to meet all domestic needs. It imported about one-



TRANSFORMERS—Built to step-up electric current to as much as 500,000 volts these transformers will serve the world's most powerful transmission line. Westinghouse Electric Corp. photograph.

eighth of the total consumed, which included recovered lead as well as metal just from the ground.

Since before 1930, American production has been decreasing more or less steadily. The average annual lead refined from ore during the 1925-29 period was approximately 660,500 tons. In 1944, less than 395,000 tons were produced. For 1946 the production is estimated at approximately 335,000 tons.

America each year uses great quantities of reprocessed old lead. This secondary recovery in the 1925-29 period was 280,000 tons a year. Much larger recovery prevailed during the war years, but it had dropped to 332,000 tons in 1944. Recovery this year is predicted as much less, but figures are as yet unavailable.

The decrease in lead production in the United States is due to depletion of ore deposits in certain districts, and to manpower shortage during the war and since. Strikes have been a factor. Shortages abroad are due to lack of equipment and manpower resulting from war devastation. Little lead may be expected for some time from Germany, Yugoslavia and Burma, and even lead imports from Mexico will be curtailed.

Science News Letter, December 14, 1946

CHEMISTRY

Mixture Detects Presence of Traces of Carbon Monoxide

➤ **DANGER** from carbon monoxide poisoning can be avoided by use of a simple, relatively inexpensive method developed by the National Bureau of Standards that will indicate by color as little as one part of the dangerous gas in 500,000,000 parts of air.

It was developed for determining the amount of carbon monoxide within aircraft, but can be used to equal advantage in buses, automobiles, garages, furnace rooms, and other places where this gas may lodge from incomplete combustion in engines or stoves.

The color indicator used in this new carbon monoxide detector is a yellow silica gel impregnated with a complex silico-molybdate compound and catalyzed by means of palladium sulfate. This mixture is placed in a five-inch glass tube the size of a lead pencil, and air to be tested forced through. The yellow indicator turns green if carbon monoxide is present, the degree of green indicating the amount of the poisonous gas.

In use the sealed ends of the glass tube are broken open and one end of the tube is inserted in an ordinary two-ounce rubber aspirator bulb equipped with a special control valve. The bulb is squeezed once, then the color of the gel is compared with a set of standard color chips. A test can be made by an untrained person in about one minute.

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ARCHAEOLOGY

Western Planned Cities Date Far Back in History

➤ **PLANNED CITIES**, such as Washington, are an old development in the Western Hemisphere, archaeologists have discovered. Peru had carefully laid-out cities with geometrically patterned streets before the Incas, who were conquered by the Spaniards.

Scientists of the Institute of Andean Research this summer mapped 300 sites of early peoples in the Viru Valley of northern Peru, revealing portions of a story of 3,000 years of human culture in the small fertile valley.

Dr. Gordon R. Willey of the Smithsonian Institution, who specialized in the settlement patterns of the early Peruvian groups, says that the 300 sites studied so far are probably about one-fourth of those in the valley.

Human beings have lived in the Viru

valley from about 1,000 B. C. to the present, with eight distinct cultural periods up to the time of the Spanish conquest.

The planned cities, which did not appear in Europe until well into the metal ages, have been unearthed in northern Peru among the remains of a culture before the Incas.

In these early cities, there were places assigned for temples, other public buildings, storehouses and dwellings. Largest of the cities was Chanchan, by far the largest city in the New World before white men came. Dr. Willey believes these planned cities were developed by a culture in which everybody knew his place and lived according to a prescribed pattern.

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INVENTION

Light Beams Help to See Down Inside Beer-Cans

➤ **INSPECTING** the insides of bottle-necked beer-cans or other opaque containers with small openings seems a baffling job. Yet it must be done before filling, to detect loss-causing faults. I. W. England of Passaic, N. J., and W. F. Punte of Syracuse, N. Y., have solved it by projecting light beams obliquely into the neck, while immediately above these lamps is a lens train that throws an image of the can's interior onto a screen which the inspector watches. Automatic mechanism feeds the cans into position, with a momentary pause to let each be viewed.

Patent 2,411,991, issued on this invention, has been assigned to the Continental Can Company.

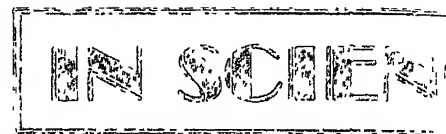
Science News Letter, December 14, 1946

CHEMISTRY

Formaldehyde Is Made From Air and Natural Gas

➤ **AN IMPROVEMENT** in the process of manufacturing formaldehyde, important as a disinfectant and as an ingredient of plastics, out of air and natural gas, has been made by Dr. Thomas K. Sherwood of Wellesley, Mass. By raising the working temperature, he completes the process in a small fraction of the time formerly required. The formaldehyde vapor is then condensed by contact with a cool formaldehyde solution. Patent 2,412,014, covering this process, is assigned to Godfrey L. Cabot, Inc., of Boston.

Science News Letter, December 14, 1946



ARCHITECTURE

Good Adobe Keeps Houses From Becoming Mud Pies

➤ **DO YOU THINK** you might beat the housing shortage by throwing up an adobe home in the style of California and the Southwest?

You'd better think twice or you might find yourself with a mound of mud after a few good rains.

This is the synthesis of advice on adobe construction given in a bulletin of the University of California College of Agriculture.

The right kind of adobe will make a good house, the bulletin says. But tests should be made to determine the characteristics of the soil.

Adobe houses can be made of bricks, rammed earth, or poured adobe or mud concrete. Costs are about the same as for a wooden home of the same size, though this can be cut by the builder using his own labor and eliminating decorations.

Science News Letter, December 14, 1946

ORDNANCE

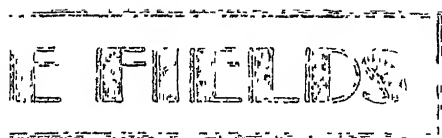
Atom Bomb Does Not Harm Weapons of Many Types

➤ **ATOM-BOMB** blasts will not injure weapons of many types, ranging from Tommy-guns to tanks, it was demonstrated by the tests at Bikini. Final evaluation of the effects of the explosions on Army materiel exposed on the decks of some of the target ships is given by Lt. Col. S. F. Musselman in *Army Ordnance* (Nov.-Dec.).

Many of these weapons, which showed no permanent effects from either concussion or radioactivity, have already been returned to arsenals, whence they will be issued to troops for regular use. Most damage from concussion was sustained by vehicles such as jeeps and tanks, which were securely bolted to the decks and hence could not "roll with the punch".

Damage from the underwater explosion was mostly salt-water corrosion, not essentially different from that shown by metal after any ordinary kind of salt-spray exposure.

Science News Letter, December 14, 1946



PHYSICS

Tiny Radio Antennas Aid Navy Communications

► TOM THUMB radio antennas are being constructed and tested in laboratories at the University of California in an effort to improve naval communications.

Tiny, scale models of transmitters of all different shapes are "given the works" in the electronics research laboratory. Promising models will be built full size and given full-dress tryouts aboard naval vessels.

Thomas McFarland, University engineer in charge of the project, says that naval communications have been seriously handicapped by the presence aboard vessels of large numbers of transmitters which interfere with one another; and by construction characteristics of naval architecture.

For example, some transmitters can send only in one direction, or in a seriously restricted arc from the ship. Thus a ship might have to travel in a certain direction for a specific antenna to be of any use.

Mr. McFarland indicated that research may develop transmitters which will overcome some of these difficulties, and that changes in ship design might be needed to solve the problem finally.

Science News Letter, December 14, 1946

ENGINEERING

Plenty of Liquid Fuels To Come From Coal

► THERE WILL BE plenty of gaseous and liquid fuels available in America for a thousand years or more, the American Society of Mechanical Engineers was told by Arno C. Fieldner, chief of fuels and explosives of the U. S. Bureau of Mines.

These fuels may not be petroleum products, however; they will be derived from coal and lignite, of which there are abundant reserves. Production from these sources will increase as the reserves of petroleum and natural gas approach exhaustion.

Coal and lignite can be converted into gaseous and liquid fuel, he said, and have been so converted for many years. Processes and equipment for this pur-

pose have been developed, and the costs are known. In recent years, in Germany in particular, processes have been put into commercial operation for the manufacture of liquid fuel from coal and from lignite.

Mr. Fieldner estimated the known fuel reserves of the United States at an energy equivalent to 2,600,000,000,000 tons of bituminous coal. Approximately 55% of this solid fuel is high-volatile bituminous coal, 23% subbituminous coal, 19% lignite, 25% low-volatile bituminous, and 05% anthracite.

A declining supply of petroleum can be supplemented also by alcohol from the fermentation of vegetable matter, conversion of natural gas by the gas-synthesis process, and the distillation of oil shale.

The cost of fuels from coal and lignite will be greater than the present cost of petroleum and natural gas, he said, but future developments in the more efficient utilization of fuels should go far in offsetting the cost of conversion.

Science News Letter, December 14, 1946

AERONAUTICS

Railway Cars May Replace Landing Gears on Planes

► FLAT RAILWAY cars on tracks on airfields are suggested to replace the present built-in-landing gears on planes.

A powered railway car operating on a track several miles long could be used for take-offs also, Lewis A. Rodert, of the National Advisory Committee for Aeronautics, told the Society of Automotive Engineers in Chicago.

Explaining that the attainment of higher air travel speeds calls for eliminating such current handicaps as conflicts in design, equipment, and technical requirements for flying, taking off, and landing, he directed attention to the possibility of eliminating the landing gear of long-distance planes and of substituting flat fuselage bottoms suitable not only for landing on moving railway cars, but for protecting passengers in case of forced emergency landing.

Launching would be accomplished by accelerating the car, the plane being released when climbing speed is reached. In landings, the plane would follow radio range beacons and glide path control equipment to land on the fast moving car which would be brought gradually to a standstill after the plane was aboard.

Science News Letter, December 14, 1946

MEDICINE

Baby Blood-Typing Is Best Identification

► COMPLETE TYPING of new-born babies' blood, with 360 blood varieties available for identification, is advocated as a replacement of the foot-printing now common practice to prevent tragic mix-ups in maternity hospitals. This idea is offered in the *Journal of the American Medical Association* (Dec. 7) by Dr. Malcolm A. Hyman of the Jewish Hospital of Brooklyn.

The 360 different identifiable kinds of human blood are made possible by a combination of the various blood types, the agglutinin P (plus and minus), and ten Rh-Hr types.

Dr. Hyman advocates collecting a little blood from the new-born infant's umbilical cord, putting it in a corked tube, and attaching this to the mother before the child leaves her side for its first bassinet. If any doubt of the baby's identity should subsequently arise, a new sample could be drawn and compared with the original one.

Dr. Hyman points out that babies' footprints, as made at present, usually become smudged and unrecognizable in a relatively short time. In any event, by the time the child is a month old the footprint has changed completely and is useless for identification purposes. The chemical pattern of the blood, on the other hand, is unchanging.

Science News Letter, December 14, 1946

PHARMACOLOGY

Pharmacists Will Take Sting Out of Iodine

► PHARMACISTS are going to take the sting out of tincture of iodine, a famous disinfectant for cuts for more than a century.

The new edition of the Pharmacopoeia of the United States of America, which will become official April 1, 1947, has dropped the familiar 7% tincture of iodine in favor of a 2% mild tincture. Just as efficient as an antiseptic and germicide, the milder tincture has the advantage of not retarding healing by destroying tissue, a frequent fault of the stronger remedy.

The Committee of Revision of the Pharmacopoeia declares, "Every druggist in the country should be familiar with this change." You will agree if you recall the sting of the old iodine disinfectant.

Science News Letter, December 14, 1946

ENGINEERING

Less Friction in World

Bearings speed almost all equipment that rolls and floats. Smallest bearings used are part of high-powered microscopes, largest are in giant presses.

See Front Cover

By MARTHA G. MORROW

➤ THERE is much less friction in the world because little and big balls and rollers are bearing some of the burdens in our vast array of machines—from lawn mowers to locomotives.

The smallest ball bearing actually used today is one that is part of high-precision electric gauges and high-powered microscopes. It is small enough to get through the eye of a needle, and not an oversize needle at that.

One of the largest roller bearings is used in giant presses that roll steel into finished sheets. This bearing is five feet in diameter.

Millions upon millions of ball and roller bearings are twirling around, reducing to a minimum useless friction in bicycles, dial telephones, vacuum cleaners and washing machines.

Use in Automobiles

Every automobile incorporates 25 to 30 anti-friction bearings. About 2,500 precision-smooth bearings are used in commercial air lines.

One of the strangest applications is in a building that has roller-bearing foundations. The idea is to allow the building to stand still when an earthquake moves the earth beneath it. The bearings take the force of the tremor from any given direction.

Some scientists want to split hairs. A knife that cuts specimens of human or animal tissue into slices 500 times thinner than a human hair whirls around on ball bearings.

Microscopic balls only 1/64th of an inch in diameter may soon replace jewels in watch bearings. Of a special chrome alloy, they do not crack as easily as the conventional quartz or gem jewels.

Ball and roller bearings reduce friction to a minimum in practically every piece of man-made equipment that rolls, floats or flies. If it contains turning parts, anti-friction bearings are probably used.

But steel balls or rollers alone do not

make a bearing. Merely inserting steel balls, for instance, between a wheel and its shaft would not solve the friction problem.

The balls are held in place by two concentric steel rings. They run in grooves or "raceways" cut in the rings. A retainer or separator is usually inserted to keep them from rubbing against each other.

In a roller bearing, essentially the same set of parts is used, except that rollers are employed instead of balls.

In modern mechanical equipment, bearings may have to carry loads of three general types. The load may be at right angles to the shaft, it may be parallel to the shaft, or it may be a combination of both, called an angular load.

The earliest modern ball bearings, used in all bicycles and automobiles, were of the angular type. In these the inner ring was placed on the axle and the outer ring on the wheel hubs. Modern anti-friction bearings are designed to operate under various combinations of these loads. They must meet different space limitations and fulfill literally thousands

of variable requirements. That is why so many standard varieties are needed.

Today more than 30,000 different sizes, types and specifications of anti-friction bearings are serving millions of machines. But despite the wide range, all bearings are precisioned to a tolerance of one-thousandth to one-millionth of an inch, depending upon the size.

During the last two years of the war, more than 30,000,000 complete ball and roller bearings were made each month for military equipment of the United States alone. Today 72% of the total output of the industry is used to give us smoother rides in trains and trucks, airplanes and buses.

Made From Steel

Balls for bearings are made from high-quality steel wire. For all sizes up to three-quarters of an inch in diameter, slugs of wire are chopped off and placed between the cup-shaped dies. These bang the steel slugs into a rough ball shape.

A ring of extra metal, left where the two dies meet, is removed in oil. The excess metal is not ground off, but is literally rolled off.

If the balls are 3/8 inch in diameter, or larger, they are hardened to relieve strains caused by upsetting the grain structure in heating. After heating in an



LUBRICATION—Eliminating hot-boxes, roller bearings installed on high-speed locomotives and trains are lubricated only when the equipment is brought into the shop for general inspection. Ball and Roller Bearing Information Center photographs.

electric furnace, the still-hot balls are dipped in oil or water to cool.

The steel spheres are reground, heat-treated and given a final precision grinding. They then may differ in size by only a small fraction of an inch and are glass-smooth.

To make them perfectly uniform in size, the balls are tumbled in barrels containing lime and water. The lapping action of the balls rubbing against each other actually cuts their diameter down a minute fraction and polishes them until they shine like mirrors. For a super-finish, the balls are tumbled against pieces of kid and chamois leather.

Trained inspectors use high-powered gauges and other special apparatus to detect any imperfections such as cuts, cracks, dents, out-of-rounds and soft spots.

The balls must be graded carefully for size. If they vary more than one ten-thousandth of an inch in precision smoothness, some might have to bear an unequal proportion of the load.

Perfect Fit

Inner and outer rings and retainers are handled with equal exactness. All parts must fit perfectly with nothing to cause friction as the balls silently and smoothly travel in the greased raceways.

Some bearings have a single row of mirror-like balls. Ball bearings of this type are used in drills, presses, on rotating shafts of automobile engines and lawnmowers.

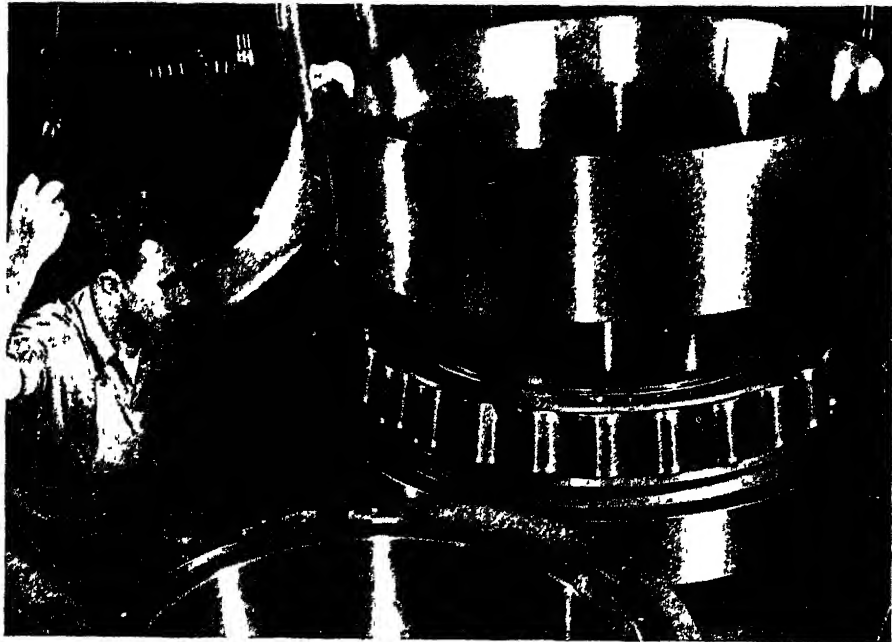
Sometimes a double row of ball bearings are used. These are particularly useful where greater accuracy of shaft location is required, as on grinder spindles. Special non-metallic retainers reduce friction so the shafts can make 30,000 revolutions a minute.

The movable parts of a bearing are carefully greased so they will run smoother and wear longer. Occasionally the balls are protected on the outside by metal strips to seal in the grease and keep out abrasive dirt and dust.

Many rollers for bearings are uniform in shape. Known as straight roller bearings, these are used where heavy loads are required.

The rollers in other bearings are thicker at one end than the other. A tapered bearing incorporating such rolls is used to carry thrust, radial and combination loads.

Where the shaft of the machine acts as the inner ring, needle bearings are used. Slim rollers, pointed at both ends, are kept in place by a retaining lip on



CROWNING IT—Outer ring is being put on enormous tapered bearing.

the outer ring or shell.

Bearings are made from several types of steel. A low carbon steel is used for the ordinary bearings, such as those in roller skates, bicycles, casters and pedals. Special chrome steel alloys make the finest super-precision ball bearings.

Metal alloys such as stainless steel are

used for non-corrosive metal balls when the bearings will be exposed to acid fumes, salt water or food products.

Anti-friction bearings are inspected and tested by devices of incredible precision. One sensitive electric gauge must be shielded from the sun, or its metal parts might expand enough to permit a

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slight error. It is this type of gauge that measures balls and rollers to tolerances of millionths of an inch.

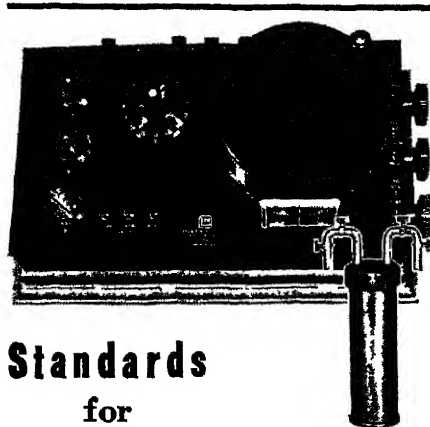
In soundproof chambers, trained testers listen to bearings on rapidly moving shafts. The slightest "foreign" noise—sometimes inaudible to the untrained ear—is detected instantly by unique instruments. The offending bearing, which may have a rough spot, a slight speck of rust, an under-size ball, is discarded.

The picture on the cover of this SCIENCE NEWS LETTER shows workers giving roller bearings a final going over as they ready them for streamlined passenger equipment.

Gloves, masks and gowns, familiar to operating rooms, are standard equipment in making the extremely small bearings. Hypodermic syringes are used when a single drop of oil must be placed on the miniature ball bearings slightly larger than the head of a pin.

The rooms are air-conditioned to filter the dust from the air and keep the temperature and humidity constant. Air-jets like those in a "fun house" remove dust from workers' clothes before they enter the assembly rooms.

To understand how bearings act as
(Turn to page 383)

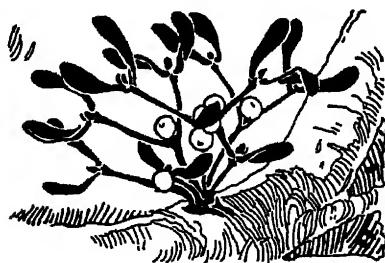


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Christmas Conservation

► CHRISTMAS wreaths and garlands are on the market again, their glossy green leaves and bright red berries tempting even the thriftiest to open his purse. Yet it is well to eye before you buy, and to refuse certain items entirely because they violate the spirit of the feast by doing real harm to God's gardens, where wild things grow.

No thoughtful Christmas shopper, for example, will ever buy anything made of ground pine, the prickly, fine-leaved plant that is often the only ground cover in great reaches of thin-soiled woods. Gatherers of ground pine rip it up heedless of later consequences, leaving the

trees' precarious roothold open to rapid erosion. Ground pine just doesn't mean Christmas to people who know.

Similarly, when buying holly you should insist on English holly. It is grown for the market in this country, and by purchasing it you help the growers to make an honest living. Native American holly, on the other hand, is always obtained by raiding the woods where it grows. Usually the raiders work in haste, for theirs is an illicit trade, and they break and rip the branches disgracefully. You can tell English holly readily by its bigger, redder berries, by its pricklier, darker green leaves—and by its higher price. But it's worth the difference.

It is all right, however, to buy the synthetic Christmas "greens" made by combining the evergreen leaves of mountain laurel with twigs of the red-fruited winterberry, gathered usually in swampy places. This plant is a first cousin to holly, but sheds its leaves in autumn. Both mountain laurel and winterberry are so abundant in the regions where they grow that once-a-year cropping seems unlikely to do any material harm.

Mistletoe, also, is something you can buy freely without any qualms of your conservationist conscience. In fact, the more mistletoe is harvested the better it is for the woods. For mistletoe, despite its romantic connotations, is a harmful parasite that robs trees of their sap, and the more of it is removed the better off the trees will be.

Science News Letter, December 14, 1946

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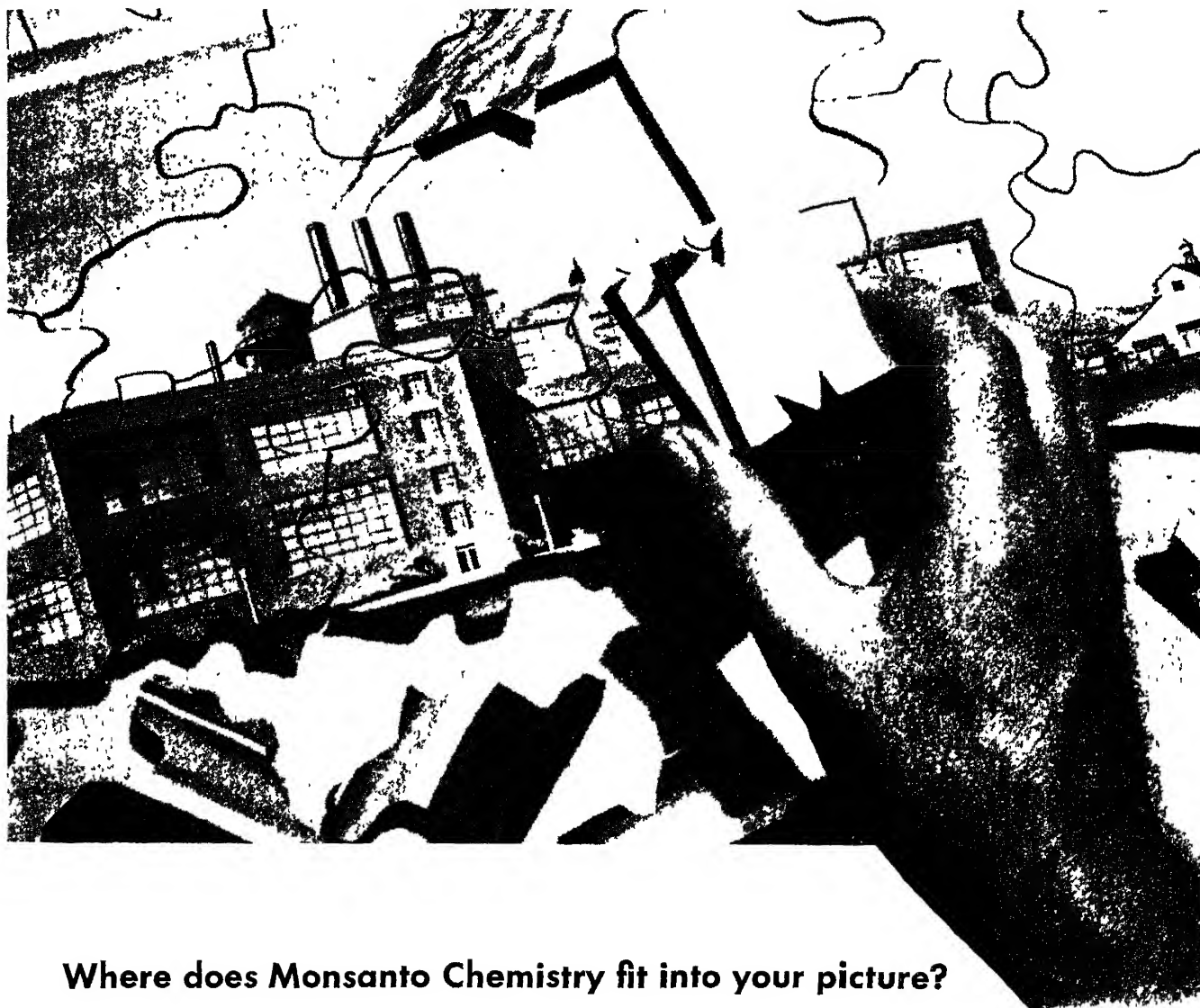
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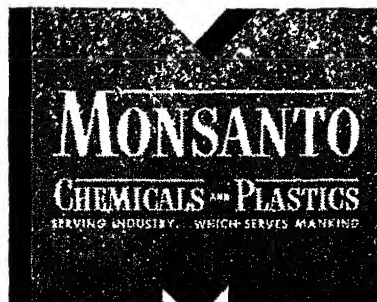
Specific answers to this headline question depend largely on your interest in any of the 43 industry classifications listed at the right. In general, however, you will get a fair indication of how Monsanto chemistry can fit into *your* picture, by knowing that these 43 key industries are served by nearly 600 Monsanto Chemicals and Plastics.

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Consult this list of major industries served by Monsanto. Whether or not you are identified with any of them, you are invited to contact the nearest Monsanto Office for suggestions that apply to your problems.

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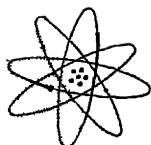
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Books of the Week

ADOLESCENT STERILITY—M. F. Ashley Montagu—Charles C. Thomas, 148 p., tables, \$3.50. A study in the comparative physiology of the infecundity of the adolescent organism in mammals and man.

CARTELS IN ACTION—George W. Stocking and Myron W. Watkins—*Twentieth Century Fund*, 533 p., \$4. A "casebook" on international cartels, giving origins and operations of cartel arrangements in sugar, rubber, nitrogen, steel, aluminum, magnesium, incandescent electric lamps and chemicals, with factual answers to many critical questions about controls in economic affairs.

EAMON DE VALERA—M. J. MacManus—Ziff-Davis, 281 p., \$3. A biography of the man who was the storm center of Ireland's fight for independence from the British Empire, as well as a dramatic record of that revolution.

FIRE FIGHTING ON FARMS—A. T. Holman—U. S. Department of Agriculture, Miscellaneous Publication No. 612, 54 p., illus., paper, 15 cents. Instructions to farmers and rural dwellers on types of fires, fire fighting equipment and chemicals, with instructions about how to build or assemble equipment for local use, and general rules about fire fighting.

FOODS. THEIR VALUE AND MANAGEMENT—Henry C. Sherman—Columbia Univ. Press, 221 p., \$3.25. A companion book to *The Science of Nutrition* by the same author. Addressed to all who are interested in individual and family health and efficiency. Chapters are devoted to each of ten food groups, each group being considered from the standpoint of its nutritional value and its purchase value.

GALVANIZING HANDBOOK—J. R. Daesen—Reinhold, 166 p., illus., \$5.25. This book presents graphically the basic principles involved in the business of zinc-coating iron and steel to prevent rusting, setting forth new methods involved. Its many photographs demonstrate the nature and cause of many defects encountered in this varied field.

GARDEN PLANS FOR LOW COST HOMES—National Garden Institute, 18 p., illus., paper, 10 cents. Another service to victory gardeners who are interested in landscaping old or new homesites, large or small. The layouts have been designed by ten outstanding landscape designers.

HEREDITY, RACE, AND SOCIETY—L. C. Dunn and Th. Dobzhansky—Penguin, 115 p., paper, 25 cents. The facts about heredity and its application to man and mammals, told in clear, simple thoroughly scientific language.

INTRODUCTION TO THE CHEMISTRY OF SILICONES—Eugene G. Rochow—Wiley, 137 p., \$2.75. The chemist, engineer and industrial designer are given a comprehensive survey of the present knowledge in the silicon field. The non-silicate compounds of silicon are discussed, as well as those silicon polymers which have achieved commercial importance, how they are prepared, their chemical and physical properties, and their possible uses.

LATITUDE 40° PLANISPHERE For Finding and Identifying Constellations in the Northern Hemisphere—Wm. H. Barton, Jr.—Addison-Wesley Press, \$1. A star map

showing the Northern Hemisphere for use of astronomers, with charts and other vital data.

THE MONEY VALUE OF A MAN—Louis I. Dublin and Alfred J. Lotka—Ronald Press, 214 p., tables, \$6. This book is concerned with man as a wage-earner and supporter of himself and his family during the productive years of his life and protection for his family after his earning ability has ceased. The discussion is strictly practical, with no consideration of sentimental values.

PETROLEUM PRODUCTION, The Optimum Rate of Production—Vol. II—Park J. Jones—Reinhold, 293 p., diagr., \$4.50. A technical work on oil production.

PLASTIC CRAFT—Ernest Dewick and John H. Cooper—Macmillan, 184 p., illus., \$5. Complete how-to-do-it instructions for making useful and decorative articles from plastics in the home or school workshop, with opportunities for the use of any tool, and for workers with many degrees of skill. There is useful information on types of suitable plastics and where they may be obtained.

READINGS IN LATIN AMERICAN CIVILIZATION—A. Curtus Wilgus, ed.—Barnes & Noble, 430 p., paper, \$1.50. A compilation of documents for use by students and teachers in the field of Hispanic America. Because of the wide range of the subject matter of the readings, the book can be used in courses of geography, Spanish, and international relations.

REFERENCE DATA FOR RADIO ENGINEERS—Federal Telephone and Radio Corporation, second edition, 322 p. and index, illus., \$2. An aid in the fields of research, development, production, operation and education in the radio industry. Chapters on transformers and room acoustics have been added, and the data on television, radar and cathode-ray tubes have been expanded, together with much other new technical information.

RUSSIA AND AMERICA PACIFIC NEIGHBORS—Foster Rhea Dulles—I. P. R. Pamphlets No. 22—American Council, Institute of Pacific Relations, 63 p., illus., paper, 25 cents. A resume of the geographical, diplomatic, economic and political relations of the Soviet Union and the United States and their effects upon the world situation.

SCIENCE REMAKES OUR WORLD—James Stokley—Ives Washburn, 318 p., illus., \$3.50. A revised edition book, written in

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simple, non-technical terms, covering such subjects as plastics, electronics, television, penicillin, radar and rockets, among others, and giving an insight into the future of new industries and new jobs.

YOUNG PEOPLE'S BOOK OF ATOMIC ENERGY—Robert D. Potter—Robert M. McBride, 171 p., illus., \$2.50. Written with simplicity and clarity for the young reader from 12 to 16.

Science News Letter, December 14, 1946

From Page 380

steel cushions for moving parts, place a heavy book on a table and try to push it with a long, thin ruler. Now put two round pencils of about the same size underneath the book and push at right angles to the parallel pencils.

When the book lay directly on the table, there was friction—resistance to motion of two surfaces in contact—at every point of contact. When the pencils were placed beneath the book, a rolling motion was substituted for a sliding motion and the book moved much more easily. Rollers and balls move more freely because only a tiny part of their surface touches the surface on which they move.

The wheel was the first important victory over friction. But wheels were poorly built at first and remained so even to comparatively modern times. The first wheel was probably a cross-section of a tree trunk. A hole in the center, perhaps burned through, held a crude type of axle.

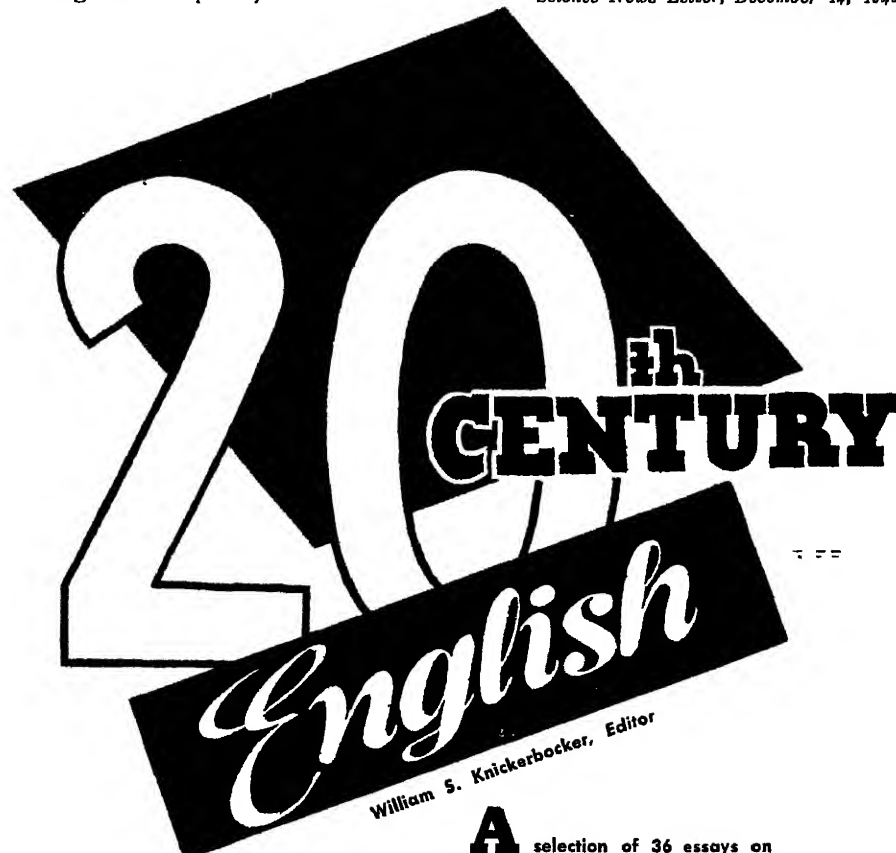
Simple wheels, however, could not turn fast or carry heavy loads, because each rested directly on the axles on which they turned. Sliding friction soon wore away both wheel and shaft. The

wheel wobbled, turned loosely, and finally fell off.

Man fought friction in early days by greasing axles and shafts with animal fat. Such lubrication helped somewhat, but heat built up by turning axles soon burned up the grease. The fat, settling toward the bottom of the shafts when at rest, was soon squeezed out. Hubs had to be greased frequently.

Until the beginning of the twentieth century most wheels worked on the sliding principle. Although the wheels turned, the axle and wheel still slid in relation to each other. Power began to be used efficiently only when wheels were rested on an assembly of balls and rollers—when the bearings between the wheel and the axle were themselves free to roll.

Science News Letter, December 14, 1946



A selection of 36 essays on modern English written by its leading exponents, among them are: John Erskine, Archibald MacLeish, H. L. Mencken, I. A. Richards.

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New Machines and Gadgets

❁ **SEAM RIPPER**, for the busy housewife, is a flat piece of metal about four inches long, shaped to fit the hand. Its hooked end is sharpened on the upper side, and slightly knobbed to help pull out the threads. There also is a tiny cutting edge on the upper side of the handle to open the seam.

Science News Letter, December 14, 1946

❁ **LUXURY DESK** for a busy executive has a built-in electric razor, radio receiver, automatic device to take dictation, and a top so finished that a lighted cigaret will leave no mark on it. Not yet available, it is adjustable in height to accommodate the user, and has drawers with an improved "finger-tip" action.

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❁ **ROUGHNESS METER**, to measure the roughness of rubber surfaces, operates by determining the resistance of a stream of air passed between the surface and a smooth plate resting upon it. The rougher the surface, the more the air that gets through.

Science News Letter, December 14, 1946

❁ **ELECTRONIC stop-watch** accurately clocks one millionth of a second. When used in conjunction with photocell triggering devices, it makes it possible not only to measure the speeds of objects at high velocity, but also produces acceleration curves to show changes in speed.

Science News Letter, December 14, 1946



❁ **SERVING TRAY**, made of a resin in combination with a printed fabric, is light, strong, durable, easily cleaned with a damp cloth, resistant to food stains and unaffected by alcohol. The picture shows one pattern, but it is produced in many designs, with any desired color effect.

Science News Letter, December 14, 1946

❁ **HOLDER** for shaving outfit is easily attached within the ordinary bathroom cabinet by adjustable rubber-padded sliding ends held in place by thumbscrews. The plastic horizontal crosspiece, either

transparent or in color, has slots to hold razor, brush, shaving-cream tube and other accessories.

Science News Letter, December 14, 1946

❁ **TELEPHONE recorder** requires no mechanical or electrical connection with the telephone wire, but picks up a two-way conversation by modulation when placed near the wire. It need not be in the same room with the telephone. The record is made on a narrow strip of safety film.

Science News Letter, December 14, 1946

❁ **HEDGE TRIMMER**, electrically operated, has 12-inch cutting blades with triangular teeth similar to farm mowing machines. The blades are moved by a mechanism at one end attached to a universal motor.

Science News Letter, December 14, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin #41. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

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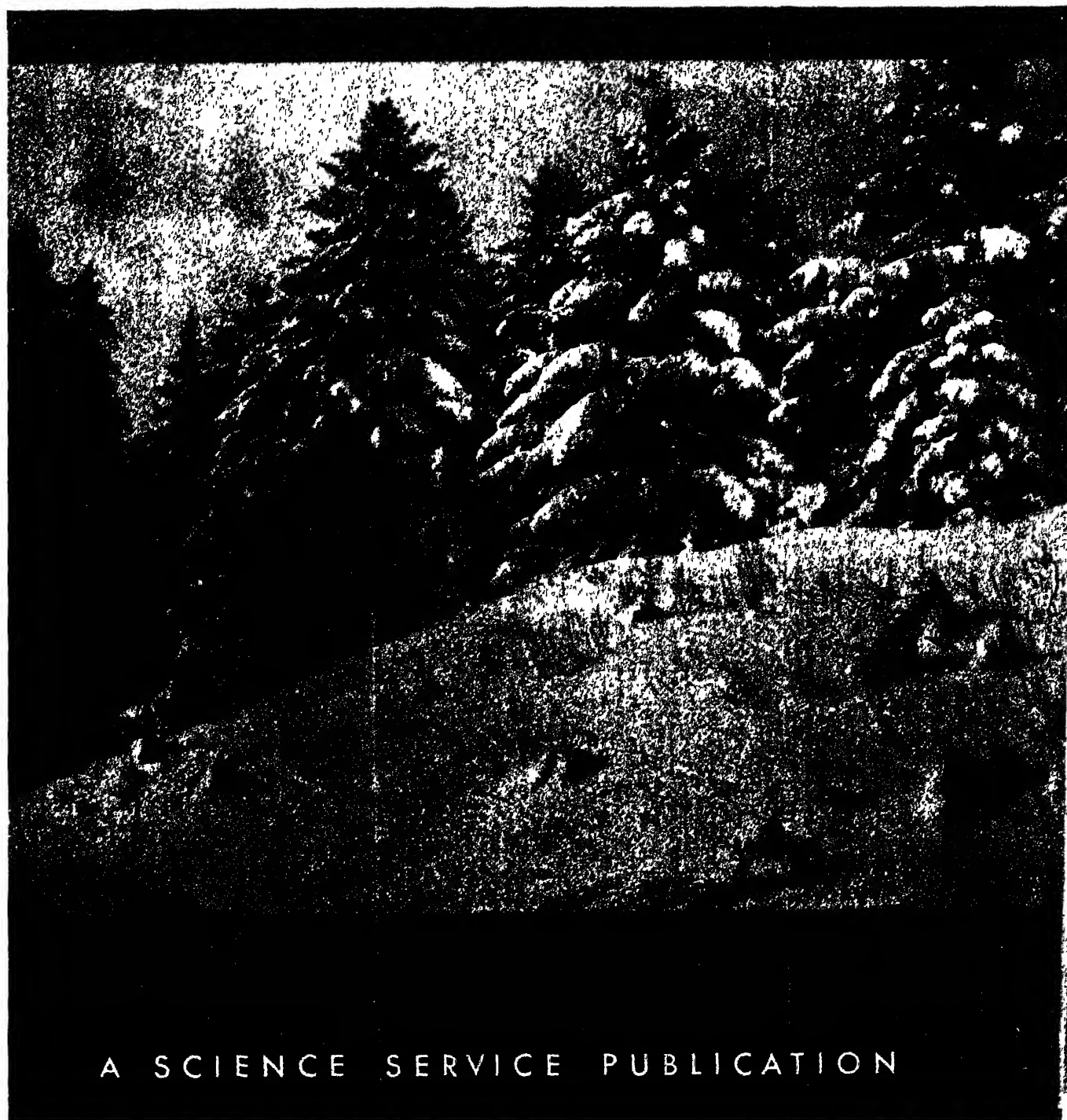
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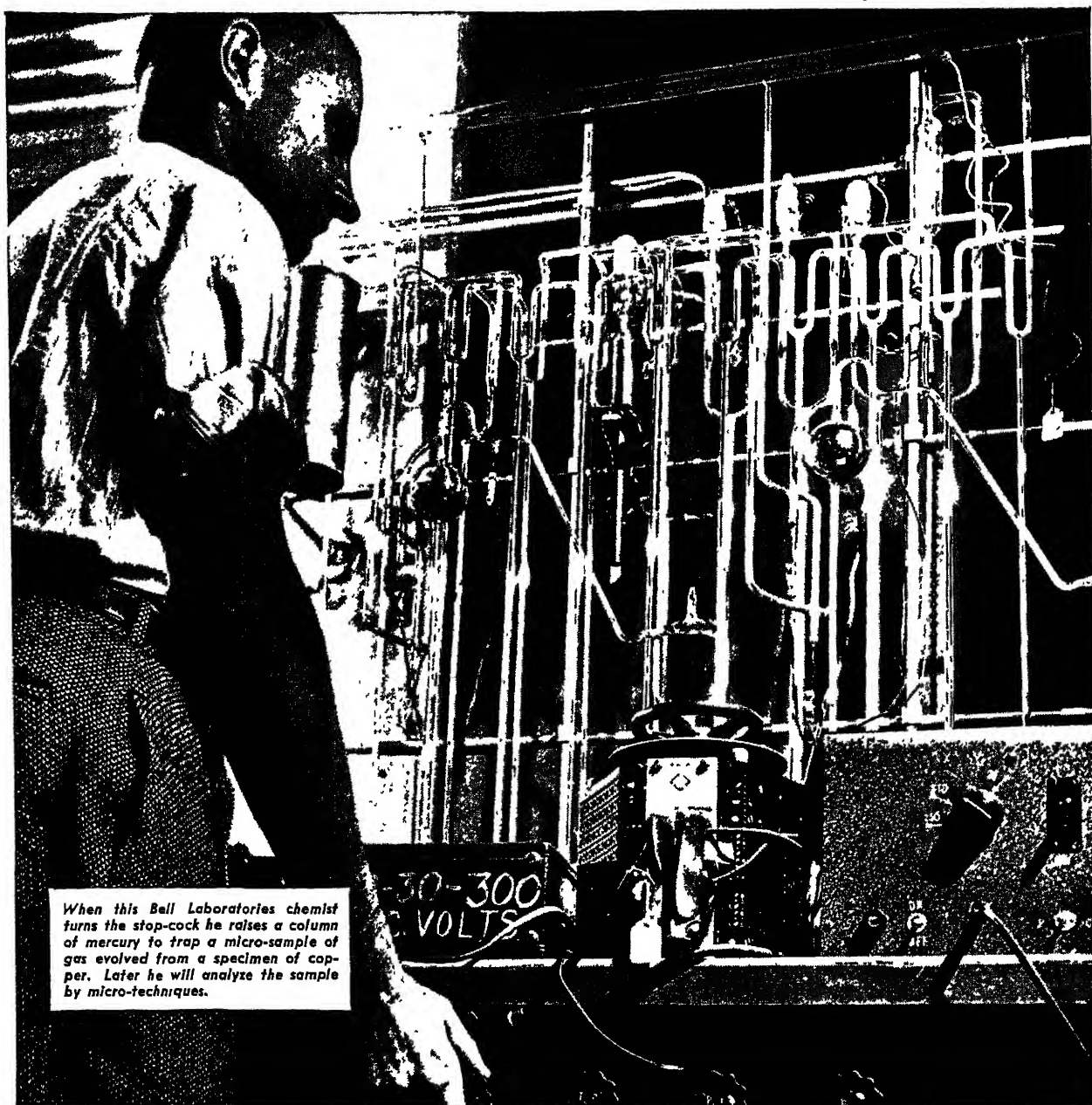
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A SCIENCE SERVICE PUBLICATION



When this Bell Laboratories chemist turns the stop-cock he raises a column of mercury to trap a micro-sample of gas evolved from a specimen of copper. Later he will analyze the sample by micro-techniques.

Trapping poisons by micro-chemistry

Touch of a finger-tip—or even the dust in apparently clean air—can carry enough contamination to ruin an electron tube. Bell System scientists found this out through micro-gas analysis using new and original techniques.

They determined what could destroy the tube cathode's power to give off electrons, and how much—to the millionth of a gram. Then, with Western Electric, they developed a manufacturing technique to keep

these destroyers out of the tubes. . . . Bell Telephone Laboratories scientists established the world's first industrial micro-chemical laboratory more than 16 years ago for the Bell System.

Today micro-chemistry is constantly at work, helping to raise still higher the standards of telephone service and performance.

BELL TELEPHONE LABORATORIES



EXPLORING, INVENTING, DEVISING AND PERFECTING FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

MEDICINE

Cancer Destroyed in Rats

Extract made of ground up rat tumors kills cancer in rats and in some cases makes them immune to tumors in first double-action against cancer.

➤ A CANCER EXTRACT that both destroys cancer in rats and makes the animals immune to further cancers is announced by Drs. Margaret R. Lewis, Paul M. Aptekman and Helen Dean King of the Carnegie Institution of Washington in that institution's annual report.

The experiments, made at the Wistar Institute in Philadelphia, are believed to be the first in which such double anti-cancer action has been achieved.

The anti-cancer material was made by grinding up rat tumors, extracting with alcohol and concentrating the extract by distillation. It was then injected repeatedly into tumors that had been implanted in 58 inbred white rats. The grafted tumors came from other rats of the same strain.

In 56 of the 58 rats, the malignant tumors, or cancers, were destroyed and

the site of the graft healed with only a slight scar. After one year, 24 of the rats were still free of cancers.

The same kind of tumors, or cancers, were again grafted onto the other 32 of the rats that had been given injections of the tumor extract. More than three-fourths of the animals, 25 to be exact, proved immune to two or three such grafts after the cancer extract injections.

When tumors of this same kind were injected into more than 5,000 rats of the same strain that did not have the extract injections, every tumor grew and not one regressed.

The extract also protected 60% of injected rats against cancers of a different kind than that from which the extract was made but which afflicted rats of the same strain.

Science News Letter, December 21, 1946

Library.

PHYSICS

Imperial Agricultural Research Institute

New Delhi

Cosmic Rays 8 Miles Up

➤ A NEW ATTACK on the mysteries of cosmic rays will be made with B-29 bombers converted into laboratories to carry scientists and their instruments as high as 40,000 feet above the earth.

This latest-announced use of the big bombers to gather data on the mysterious rays that bombard our atmosphere from outer space will be sponsored by the Office of Naval Research, with Dr. Carl D. Anderson, Nobelist and professor of physics at the California Institute of Technology, heading the scientists working aboard the airborne laboratory. Three Army Air Forces B-29's for the cosmic ray flights will be based at the Naval Ordnance Test Station at Inyokern, Calif., in the Mojave Desert.

Previous use of the war's biggest bombing planes, turned laboratories, included a series of flights last summer from approximately the Canadian border to Peru, counting cosmic rays with "telescopes" of Geiger counters at different altitudes. This work was sponsored by the AAF in cooperation with the National Geographic Society and the

Bartol Research Foundation of the Franklin Institute.



PREPARATION—Scientists make a final test of the automatic camera that will record the path of the cosmic ray from a magnetic cloud chamber. U. S. Navy photograph.

In addition to B-29's, American scientists are using another mighty weapon of World War II, the Germans' V-2 rocket, to get new knowledge of conditions miles above the surface of the earth and particularly for probing the secrets of cosmic rays.

B-29's will be used in the California flights with scientific equipment replacing the aerial guns of the planes, and scientists working comfortably at high altitudes in a pressurized cabin.

Dr. Anderson, who discovered the particle of matter called a positron, will use a magnetic cloud chamber, to gather data on cosmic rays. He will be assisted by Dr. Paul E. Lloyd, research fellow at the California Institute of Technology, and three graduate students, Raymond Adams, Ronald Rau and Ram Saxena, a student from India.

The cloud chamber, in which a cosmic ray leaves a visible path which can be photographed as it passes through, will be mounted in a B-29 bomb bay. Three other cloud chambers will be placed aboard the plane by a group of California physicists headed by Dr. Robert B. Brode.

Dr. Brode, Dr. Wayne L. Hazen and Dr. William B. Fretter are investigating the size and life history of the mesotron, a particle of matter now known only in cosmic rays. Assisting them will be Donald Moore and Stanley Jones, graduate students.

With the four cloud chambers, some 1,200 photographs are expected to be made daily, with an average of five hours of flights each day. Most of the



SNOW BLOWER—Designed for airports in the Snow Belt, a rotary snow plow blows snow 150 feet from the runway. Gathering wings collect snow to within a half inch of the runway surface and force it into double rotary wheels. Heavy-duty rotary blades and feeding rake pulverize the ice and snow so that it can be cast 50 yards either to the right or left of the runway. The snow is spread out over the field, thereby eliminating the danger of ridges that cause excessive drifting on the runways. Up to 51 tons of fresh fallen snow can be handled per minute by the new Bros Airport Special Rotary Snow Plow.

photographs are expected to verify present knowledge of cosmic ray behavior, but some of the pictures of the rays' paths may reveal new information.

Cosmic rays are natural atom-smashers,

more powerful than man-made cyclotrons, and important discoveries in nuclear physics and atomic energy may result from solving some of the mysteries of these potent rays.

Science News Letter, December 21, 1946

MEDICINE

Radioactive Blood Saves

Atomic energy through medical research has saved more lives than were lost at Hiroshima and Nagasaki. Radioactive iron used as tracer in blood study.

➤ **RADIOACTIVE** blood cells helped 100,000 or more wounded in the Pacific theater, Drs. John G. Gibson, 2d, and Robley D. Evans of Massachusetts Institute of Technology report in a now-it-can-be-told story of wartime research.

This work is one example of the "sober truth" that "through medical advances alone, atomic energy has already saved more lives than were snuffed out at Hiroshima and Nagasaki," the scientists state in *Technology Review*.

Before the Navy started flying whole blood instead of plasma and albumin from donors in the United States to the wounded in the Pacific, it had to know how long the red cells would stay alive outside the body and be capable of carrying oxygen through the body. It also had to know how long these stored and

transported red cells would remain alive and active in the body after transfusion.

Two radioactive isotopes of iron made in the M. I. T. cyclotron gave the answer. One of these isotopes emits beta rays and has a half-life of 47 days. The other, with a half-life of about five years, emits soft rays of very little penetrating power which are hard to detect. Because scientists know how much iron is normally contained in each red blood cell (about a thousand million atoms or one-tenth of one percent), it was possible with the radioactive irons to follow the red cells throughout their lives.

A very small amount of radioactive iron, the one with five year half-life, was given to blood donors in the form of ferric ammonium citrate. The donor was "activated" within 10 days to two weeks

by this dose. His blood was then drawn into the preservative solution under test. This was stored under various conditions and at various temperatures and for varying lengths of time. Just before it was transfused, the recipient in the experiment got a small dose of red cells tagged with the other radioactive iron isotope. This showed the volume of red cells circulating in his body before the transfusion. With new types of Geiger-Muller counters developed to detect each of the two kinds of isotopes, it was easy to measure the percentage of transfused cells that had survived storage and were still alive and active in the body after transfusion.

Science News Letter, December 21, 1946

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GENERAL SCIENCE

Science Review for 1946

Science progress for 1946 shows beginning of research with radioactive isotopes and harnessing of atomic energy for peacetime purposes.

This summary of the year's happenings in the world of science is limited by space to just the highlights. Most of the events are described in detail in the pages of the SCIENCE NEWS LETTER for the current year. If you wish to refer to any particular report, you may find it readily through the index (See SNL, June 29 and also the issue which will appear next week, Dec. 28).

By SCIENCE SERVICE STAFF

► **THE PROBLEM** of the control of the atom bomb ranks at the top of science's list in 1946. The beginning of the research use of radioactive isotopes made in atomic energy piles may be judged in subsequent years as the most important event of the year. The secrets of photosynthesis, cancer, and even life itself may be discovered by such investigations.

The United States succeeded in putting the control of atomic fission and nuclear energy into the hands of a civilian commission, while the United Nations found that the international control of the atomic bomb became its major concern, difficult of solution.

The specter of biological warfare was added to atomic warfare as a probability for the future if nations cannot keep the peace. While BW is still top secret in its details, enough was released to indicate its effectiveness and to reveal that wartime researches developed major protection against some of the great plagues of all time.

Streptomycin went into commercial production and was demonstrated as a major cure for many diseases.

Rocket and jet propulsion became recognized as the motive power for flying in the future, particularly military craft. Tests with V-2 rockets succeeded in getting photographs of the sunlight outside the ozone layer that shields the earth, movies of the earth from unprecedented heights and record altitude counts of cosmic rays from outer space.

While legislation for a federally supported national science foundation failed in the 79th Congress, the United Nations Educational, Scientific and Cultural Organization (UNESCO) passed through its organizational period.

ATOMIC POWER

Meson's Mass Is 202 Times Greater Than Electron

► **MESOTRONS**, the particles believed to hold the atomic nucleus together, were measured for the first time and found to have a mass 202 times greater than the mass of an electron.

Photographs of atom-smashing in cosmic rays revealed the creation of mesotrons from the disintegration of nuclei.

Neptunium 237, the third chemical element to be split by slow neutrons and made to release atomic power, was announced, another isotope of uranium, U-233, was also announced as a fissionable element, which can be formed by bombarding thorium.

Thirty self-destroying chemical elements produced by the atomic bomb, including the previously named radioactive isotopes of five elements (barium, iodine, yttrium, xenon, and krypton), were announced, isotopes previously undiscovered include three of tin, two of antimony and one of cesium.

Institute of nuclear studies, a kind of super-university of the atomic age, was organized in connection with the atomic energy operations concentrated at Oak Ridge, Tenn.

Over 400 artificial radioactive isotopes of

ordinary elements have been made public although a considerable number are still in the secret category, many of these isotopes are useful for tracer experiments in chemistry, physics, biochemistry and medicine.

Five units of radioactive carbon isotope 14, created by atomic bombardment from the fission of uranium 235 or of plutonium, were shipped from Oak Ridge for biological research.

Carbon isotope 13 was made available for research use.

Radioactive isotopes of carbon, sulfur, phosphorus and iodine, by-products of atomic research, will be made to order at U. S. atomic energy plants for biological and chemical tracer studies of diseases.

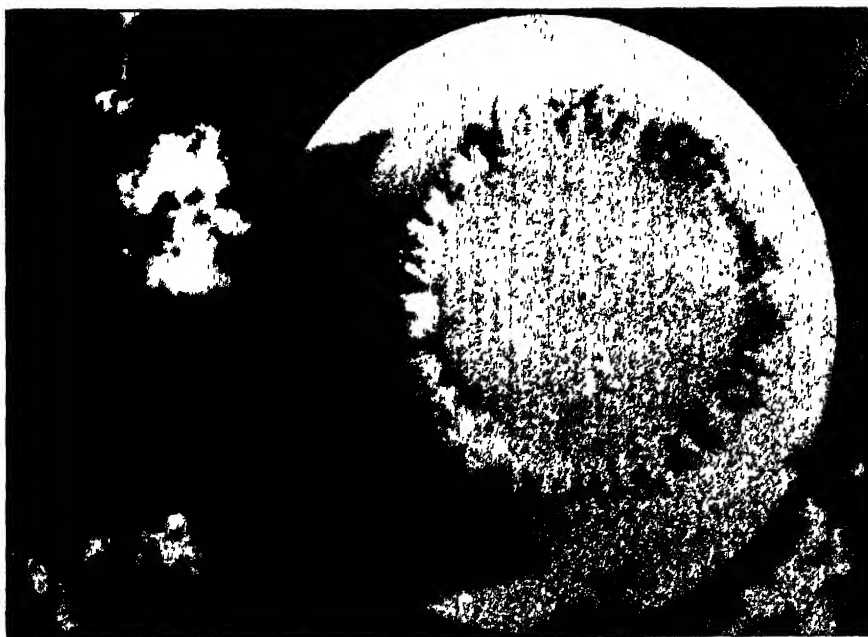
Atoms from atomic nucleus transformations, with energies 10,000 times greater than those involved in ordinary chemical reactions, were found to create new types of chemical combinations.

A 200,000,000-electron volt beam of heavy hydrogen atomic beams was produced for the first time in the world's history, with the new 4,000-ton supercyclotron.

Radiations equal to those from three grams of radium were produced by a 4,000,000-volt betatron; useful in taking sharper X-ray pictures, the equipment to produce them can be installed for one-tenth the cost of a quantity of radium which would give an equal amount of radiation.

Protons were accelerated by an 85-ton cyclotron to a new energy high of 15,000,000 electron volts.

New atom-smashing machine designs include a 500,000,000-volt cyclotron to smash



NO TOY BALLOON—Water, steam and radioactive substances released in this Baker Day blast were photographed from a plane almost directly overhead at the instant of the detonation. Joint Army Navy Task Force One Photo.

atoms; a 300,000,000-volt synchrotron, designed to split protons and neutrons within the nucleus, a 70,000,000-volt synchrotron; a 4,000-ton cyclotron that may permit the artificial production of cosmic rays, a 2,000-ton cyclotron to accelerate protons up to an energy of 300,000,000-electron volts, and an 8,000,000-volt Van de Graaff generator for use in atom smashing, work was begun on a "linear accelerator" atom smasher that may speed the hearts of atoms to billions of volts.

Basic patents on construction of the betatron were made available for licensing by the U. S. Patent Office.

Transmutation of gold into mercury by cyclotron bombardments provided a new standard for length measurements in grinding lenses and testing optical equipment; measurements are made with an accuracy of billionths of an inch by a sharp green light ray, produced by the transmuted mercury.

An electronic device that detects minute leaks in air-tight equipment by a mass-spectrometer tube was developed for atomic research work.

The State Department released a report on atomic energy control which lifted some of the secrecy surrounding atomic fission and atom splitting, methods of denaturing uranium 235 and plutonium to make them incapable of producing atomic energy were announced.

Individual atomic particles from fission reactions radiate as though they were at a temperature of thousands of millions of degrees Fahrenheit, so that it is possible as a source of power to heat the water or other liquid which cools the fission pile to any desired temperature, it was announced.

Electromagnetic processes for the separation of the Uranium 235 isotope from a uranium compound by mass spectrograph methods were revealed.

Civilian control of atomic energy in the United States was placed in the hands of a five-man commission headed by David E. Lilienthal, created by the McMahon atomic energy bill; the bill prohibits exchanging atomic information abroad without Congressional approval, and calls for the death penalty for revealing atomic secrets.

Minimum size of active plutonium for the atomic bomb was revealed to be between 22 and 66 pounds.

The first atomic bomb to be tested under controlled conditions was dropped over Bikini Atoll on July 1; known as "Test Able," the world's fourth atomic bomb damaged half the entire fleet of 73 target ships so badly that at least five sank within a few hours.

Radioactive mist on July 25 from the second Bikini test, the first underwater explosion of an atomic bomb, spread throughout 75 ships carrying instruments and experimental animals in the "Test Baker" target area.

The world's fifth atomic bomb sank more than four times the ship tonnage destroyed by the aerial "Test Able" burst, and made all surroundings so radioactive that the area was uninhabitable for a considerable period of time.

More than 50 different types of instruments were used to measure blast effects, pressures, shock and radioactivity in the air and under water, from the Bikini test bombs.

Bikini tests showed that rats are more resistant than humans to radiations from atomic

explosions; goats and pigs have approximately the same sensitivity as man, guinea pigs are more susceptible to the radiations.

Radon, rare radioactive gas, generated by the second atomic bomb at Bikini was detected in the atmosphere over Oklahoma three days later.

World control of atomic energy was considered by the United Nations Commission on Atomic Energy, with Bernard Baruch as the United States representative, emphasis was placed on the need for control of human emotions and reactions to atomic power, and peacetime atomic research into the mysteries of cancer, heart disease, and other human ills.

AERONAUTICS

Army XS-1 Built For Transonic Research

► ARMY XS-1 rocket plane, incorporating the latest supersonic findings from wind tunnel studies, was built for research in the transonic range.

Navy's turtle-shaped experimental fighter plane, XF5U-1, had a speed range from 40 to 425 miles per hour, later to be increased.

Army's giant Flying Wing bomber and cargo plane, the XB-35, was equipped to carry a 120,000-pound gross load on long-range operations.

Army's long-range jet fighter, the XP-81, had a gas turbine engine in front to drive propellers, and a jet-propulsion engine in the rear, the jet-fighter XP-84 Thunderjet was designed to fly more than 590 miles per hour.

Navy Corsair, fighter and bomber with a speed of over 400 miles an hour, was equipped with a new two-stage turbo-supercharger, raising the possible altitude of the plane to above 40,000 feet.

Navy's first jet-propelled carrier-based fighting plane, the FD-1 Phantom, attained a speed of more than 500 miles an hour.

"Navar," a new radar control system for airport traffic and navigation along airways, was proposed; the system will allow operators on the ground to follow on a chart the actual position of all aircraft within an 80-mile radius.

Four ram jet engines, "3AB-birds" and "Cobras," were tested at supersonic speeds.

An electric catapult launched planes at high speed from short runways, hydraulic catapults permitted aircraft carriers to handle many more planes on their flight decks.

Injections of liquid oxygen were found to increase the power of aircraft engines for sudden spurts.

Cloud detector that shows invisible dangerous clouds through use of infra-red rays was devised to make night flying safer.

A system capable of measuring airplane speed at or above the speed of sound was put into operation; as speeding planes cut across radio detection beams, signals sent to the ground indicate their speeds.

Study was begun to reduce noise in airplanes, including possible change in propeller shapes and engine mufflers.

Weather information, collected from planes en route, was used to determine the shortest flight-time path and was broadcast for the use of pilots in the air.

World's most modern 1,500-mile-an-hour wind tunnel, weighing 4,000 tons and equipped to vary air pressure from one-sixth to six times the atmospheric pressure, was built to test models of guided missiles, and

jet and rocket-propelled aircraft.

Pressure suit to support life in a vacuum and allow for complete mobility was created for use by airmen in high-altitude, supersonic flights.

Swivel landing gear showed promise of enabling small high-wing airplanes to make safe landings in cross winds.

"Flying mailcar" cargo plane, equipped to carry seven tons of mail and roomy enough for clerks to sort letters en route, was used to speed airmail service.

Push-button flying, a system that takes off, flies, and lands an airplane automatically, was successfully installed.

Glass fiber plastic wings and an all-glass fiber fuselage for planes were developed, strength tests indicated that glass fiber may be adaptable for radio-directed pilotless planes and planes with supersonic speeds.

B-29 Superfortress, remaining at an altitude of over 40,000 feet for three hours and 38 minutes, set an endurance record for stratosphere flight.

New records established include a 11, 235 6-mile flight in a Lockheed P2V-1, and a speed of 615 miles per hour set over a 1864 mile course by a British Gloster Meteor.

Light-weight search radar was designed to give pilots accurate fluorescent pictures of cities, rivers, and terrain.

A barometer-like device that automatically pulls the ripcord in experiments made parachuting safer from high altitudes.

"Ring-process" ignition system, a new method of igniting airplane engines without sparkplugs, was revealed.

Sparkplugs with electrodes that grow with use and an airplane ignition system with high-frequency currents to fire the sparkplugs, were developed for high altitude flying.

An electronic instrument for measuring the altitude of clouds was installed at weather stations throughout the United States.

An automatic plotter used a spot of light on a chart to show an airplane pilot during flight his geographical position.

An airplane windshield, coated with a transparent conductor, eliminated ice and fog with an electrical current.

Giant centrifuge was designed to study man's reactions to supersonic speeds and to develop protective devices and means for extending these limitations.

Navy's new training plane, the XNQ-1, was designed with a safety cockpit and a one-piece bubble canopy, to give an all-around view to instructor and student.

Built to withstand vertical dive speeds of over 500 miles an hour, Navy's new dive-torpedo-bomber, the "Mighty Mauler," had a bomb or rocket capacity of 4,000 pounds.

Capable of carrying a ton of radio and radar apparatus, the Navy's long-range patrol and search bomber, the P2V, "Neptune," was designed to fly at more than 300 miles an hour.

Construction of a British jet-propelled, flying-wing commercial plane that may be able to cross the Atlantic in seven or eight hours, was announced.

ARCHAEOLOGY AND ANTHROPOLOGY

Ruins Near Viru Valley Were Large, Ancient City

► Eleven square miles of ruins located near the Viru Valley in northern Peru show that

Chanchan, a Peruvian center centuries before the Inca Empire, was the New World's largest ancient city.

Fragmentary remains of man's most ancient kindred, including *Meganthropus* from Java and *Gigantopithecus* from China as well as all known specimens of *Pithecanthropus*, famous ape-man of Java, were brought together in this country for intensive study.

An ancient wall, 4,500 feet long and at least 120 feet high, was unearthed within the heart of a mountain ridge in north-eastern Paraguay.

Five gigantic stone heads, monuments of the La Venta culture that was older than the Mayas, were dug up in southern Mexico.

The mysterious great stone heads on Easter Island were declared to be less than 800 years old.

Twenty-seven arrow-heads and knives found among 50 or more fossil skeletons of giant bison show that primitive hunters made a highly successful kill and cut up their quarry for feasting or drying in the sun.

New evidence that man inhabited North America for about 25,000 years was discovered in Mexico and California.

Remodeling of the Melbourne skull from Florida gave a better idea of the human type that lived on this continent near the end of the Ice Age.

ASTRONOMY

Giacobini-Zinner Caused Meteor Shower of Century

► THE century's most spectacular meteor shower occurred as predicted the evening of Oct. 9 when the earth plowed through debris left by the Giacobini-Zinner comet; on the West coast 4,000 "shooting stars" were counted during one hour; in the East clouds veiled the spectacle, which nevertheless was recorded by radar.

The star T Coronae Borealis suddenly brightened to second magnitude and in practically all details duplicated the light variations of its outburst in 1866; the old nova, Nova Sagittae of 1913, also suffered a second outburst; these brought to six the number of known repeating novae and demonstrated that exploding stars are actually cyclic variables.

Angular diameters of several bright stars were determined by studying 30-foot diffraction rings created when the moon cut off the star's pin-point of light by coming between it and the earth.

Reflection of radar waves from the surface of the moon inaugurated the use of radar in exploring interplanetary space.

Stratospheric rockets and "satellite" laboratories made it possible to study cosmic radiation at high altitudes and above the ozone layer to photograph the solar spectrum from 1500 to 3000 Angstroms.

Several sunspots, large enough to be seen through smoked glass, caused shortwave radio broadcasts to be blacked out; the sun spot group visible early in February is the largest on record, covering an area of about 6,000,000,000 square miles.

The new comets Timmers, Padjusakova-Rothbart, Jones and Bester were discovered; periodic comets Tempel, Brooks, Oterma and Giacobini-Zinner were rediscovered; discovery that the faint comet Schwassmann-Wachmann never entirely disappears raised to two the number of always-visible comets.

Six more superdense stars were discovered,

raising the total of known white dwarf degenerate stars to 24.

Hitherto unknown molecular bands of carbon dioxide were found around Venus and of ammonia around Jupiter by use of an infrared spectrograph.

A giant prominence similar to those erupting from the surface of the sun was discovered on one component of the double star Zeta Aurigae.

Construction of a Schmidt-Baker reflector, including an additional mirror to produce a flat field instead of the curved field of the Schmidt telescope, was sponsored by international collaboration.

Four cameras of unique design were constructed for high altitude triangulation of meteors.

The dazzle of the sun was eliminated through use of an icaroscope, telescope-like instrument, where the afterglow image of the sun is viewed on a transparent phosphor screen.

Temperatures similar to those found on the earth exist in interstellar space, consideration of inter-actions between gases and solid grains indicated.

Polaris, the North Star, was found to be a Cepheid variable, having half the variation of any other known star of this type and being only 10% brighter at maximum than at minimum.

Timing the rhythm of the northern lights showed that within 20 seconds light starting at minimum brightness reached a maximum of 20 times that intensity, brilliant northern lights were visible throughout northern latitudes on July 27.

BIOLOGICAL SCIENCES

Wartime Research Brought Vaccines Against Diseases

► BIOLOGICAL warfare research brought such peacetime benefits as vaccines against the cattle plague, rinderpest, two highly fatal poultry maladies, Newcastle disease and fowl plague, psittacosis and tularemia; and an improved toxoid to fight botulinus poisoning in food.

Botulinus toxin, so powerful that one ounce could wipe out almost the entire population of the Americas, was announced as developed in biological warfare preparations.

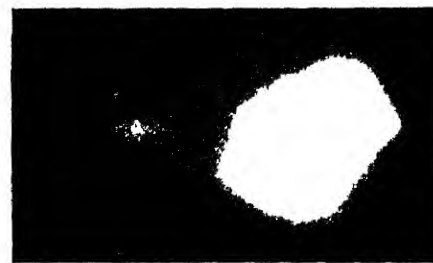
Wartime development of plant-killing chemicals that could have been used in attacking enemy crops was disclosed.

Several powerful insecticides revealed include insect-killer NMRI-448, effective up to 30 hours after spraying; mosquito-repellent 612; benzene hexachloride, against cotton insects; 666 against parasitic ascarid worms, velsicol 1068; and DPE, TDE, and DFDT, all chemical relatives of DDT.

New penicillin-like antibiotics discovered include colistatin and litmocidin, produced by a soil organism; chemical produced by a germ found in human saliva; two compounds from wild ginger and one from dead and decaying leaves; clavacin, produced by an organism isolated from manure.

Female sex glands of white mice were successfully transplanted into the bodies of white rats in the first ovarian transplantation from a different species; ovaries were successfully transplanted from one female dog to another of different breed.

Unborn embryo mice, in an experiment expected to aid cancer research, were enabled to produce living offspring through the



BIKINI GHOST—A small dead fish, netted in Bikini lagoon shortly after the submerged explosion of the atom bomb had rendered radioactive not only the water but all things in it, was placed on a piece of photographic film. The fish's own radioactivity imprinted its image on the emulsion.

transplantation of their still-immature ovaries into the bodies of other female mice.

Fungi and viruses that cause disease in plants were grown for the first time on masses of plant tissue, fed on a chemical solution.

Treating parent spores with mustard gas produced 29 new physiological varieties of a fungus.

Noticeably different strains of bacteria were produced by adding a high concentration of acenaphthene, compound known to produce changes in higher plants, in their nutrient broth.

Fish species were found to make typical and identifying noises by such mechanisms as muscular vibration of the swim-bladder or harsh grinding together of their teeth.

Late blight of tomato caused heavy losses in the canning crop.

Locusts destroyed a large part of the grain crop of Argentina, Uruguay and Brazil.

The world's largest soilless gardens, where vegetables can be raised in gravel beds on water solutions of fertilizer chemicals, were constructed for occupation forces in Japan.

Rearranging the DDT molecule produced a variety of DDT that kills the larvae of malaria-bearing mosquitoes, but is ineffective against adult mosquitoes, house flies and body lice.

Giant lilies of lasting beauty were produced by the use of the "evolution-drug," colchicine.

"Tristeza," a disease that attacks grafted citrus fruit trees, was described from South America, where it has already destroyed at least half of the fruit trees in the principal citrus area.

Excess of manganese in acid orchard soil was found responsible for a disease that produces dead areas on the inner bark of apple trees.

Molybdenum in pastures was found to cause a mysterious sickness in cattle.

Sulfa drugs were used to save young trout and salmon from furunculosis, destructive hatchery disease.

Five small worms broke the dormancy record for nematode worms with a 39-year sleep on a stored rye leaf.

Methoxone, a weed-killing chemical related to 2,4-D, increased the yield of wheat in field tests.

Research was begun to adapt bacterial warfare for combat against insect pests.

Vaccine that prevents distemper in dogs

was used successfully as a cure for the disease.

Birds were kept from eating rodent pest baits by dyeing the poisoned grain either bright green or yellow.

The supersonic inaudible songs of grasshoppers, measured with a special meter, were found to be at frequencies around 40,000 vibrations per second.

Motherless male insects were produced from eggs heavily treated with ultraviolet radiation and fertilized with untreated sperm.

Carbon dioxide was found to be the best anesthetic for surgical work on insects.

Houseflies were used to cross-pollinate celery plants.

First case of allergic skin disease in a horse was recorded.

CHEMISTRY AND PHYSICS

Electronic Brains Solve Mathematical Equations

► AN electronic computing machine, containing 18,000 electronic tubes and capable of adding numbers in 1/5000 of a second, was devised to speed solution of mathematical equations; a desk-sized mechanical "brain" was designed to solve linear algebraic equations.

The magnifying power of an electron microscope was doubled by an improved magnetic lens that made it possible to distinguish particles separated by only 50 billionths of an inch.

Production of radioactive isotopes of four chemical elements, numbers 43, 61, 85, and 87, closed the last gaps in the chemical table but showed that the elements previously reported for these numbers, masurium, ilinium, virginium and alabamine, were errors and must be replaced.

Infra-red equipment, in which invisible heat waves are converted into visible images, used in communication systems and Army night-seeing snooperscopes, was revealed.

Use of cesium metal vapor as a wave generator in an electric lamp improved infra-red communication systems that permit conversation within a ten-mile range without use of wires or radio.

Dry-ice fragments against a cloud of supercooled droplets in a laboratory cold chamber formed ice crystals that fell like snow; the process may be useful in clearing dangerous supercooled clouds over airfields.

Nitromethane, an explosive more powerful than TNT but much safer to handle, was made by combining nitric acid and natural gas.

Lactic acid and acetic acid, valuable industrial chemicals, were produced cheaply from pulp mill waste by a new fermentation process.

Synthesis of sucrose from simpler compounds by a process using phosphorus, led to the creation of two sugars not found in nature.

Explanation of the way in which two electron particles get together by passing between them a bundle of light, called a photon, opened the way for understanding atomic nuclei and cosmic rays.

Cosmic ray showers are 300 times more numerous in the upper atmosphere than at ground level, and the peak concentration of the mesotron particles generated by cosmic rays is at 100,000 feet, firing a V-2 rocket to a height of 60 to 70 miles revealed.

Highly sensitive detector for invisible

infra-red rays was made with a phosphor containing lead.

Paper strips coated with magnetic iron oxide were used to record sounds, voices and music.

The existence of two undiscovered particles without weight or mass, but that may travel with the velocity of light, was indicated by wave studies.

Pure oxygen was obtained from the air by using synthetic chemicals to absorb it and later give it off.

An electromagnet, capable of exerting a pull of 4,000 pounds, was developed to study the magnetic and crystal properties of metals.

Simple process for obtaining activated carbon from anthracite coal was developed.

Redness of human hair was found to be proportional to the amount of a newly-isolated organic compound of iron.

Artificial sunlight was created by passing through a sheet of water a mixture of lights from various types of electric lamps.

Triglycine hydroperiodide, an iodine compound, was found an effective new disinfectant for drinking water for Army canteens.

Low-temperature electric dry cells of the calcium chloride-ammonium chloride type were found suitable for use in Arctic climate.

Titanium compounds were found to be suitable substitutes for condenser grade mica in electrical applications and other dielectric uses.

Heat-absorbing, color-transmitting glass was developed to permit projection of motion pictures in original colors and protection of television actors from the intense heat of floodlights.

An alloy of cobalt and chrome that shows temperature by color changes was developed.

Amount of carbon monoxide present in a room can be determined by noting the color change in a special yellow silica gel preparation when in contact with the air to be tested, it was announced.

A substitute for carbon black that can be used without discoloring rubber was produced from sand.

Reversing the electroplating process made it possible to polish silver, as well as aluminum, zinc, copper, brass, nickel, tin, cobalt, nickel-silver and various iron alloys, while still in an acid bath.

Helium was used successfully as a tracer to determine underground conditions in oil fields.

Freon chemical compounds were found to be more effective in extinguishing gasoline fires than the long-used carbon dioxide and other inert gases.

The sweetest substance known, a new compound 4,000 times as sweet as sucrose, was developed from benzene.

A method of coagulating crude rubber from latex with chemicals sped up production of natural rubber.

Synthetic rubber, made from isoprene by an improved process, had more bounce and more stretch.

A 1000-watt mercury vapor lamp was developed to give three times the light of a 1000-watt incandescent bulb.

Trioxane heat tablets, which burn without odors or poisonous gases and produce a steady blue flame not easily extinguished by wind, were developed.

The angle made by a drop of water on an oil-coated surface showed the effectiveness of rust protection oils.

Aluminum powder added to priming coats

on wood improves the fire-retardant properties of paint, it was discovered.

Phosphorescent plastics, that glow visibly for six to eight hours after exposure to sunlight or other illumination, were developed.

The Nobel prize in physics was awarded Dr. P. W. Bridgman, Harvard University, for his work on ultra-high pressures.

EARTH SCIENCES

44 Earthquakes Recorded On Seismograph Instruments

► THERE were 44 earthquakes of sufficient strength to record themselves on distant seismograph instruments. Outstanding earthquakes on the ocean bottom included one near the Aleutian Islands that produced a destructive tidal wave on the coast of Hawaii, one along the Dominican coast that was followed by an exceptionally long and severe series of aftershocks, another centered off the northwest coast of Vancouver Island.

Airborne magnetometer carried by a cable under an airplane was used to survey for oil and mineral deposits.

Magnetic North Pole was found during the past 40 years to have moved 200 miles north from Boothia peninsula, north of Hudson Bay.

A huge canyon, five miles wide with walls more than 600 feet high was discovered along the lower Mississippi river, cut by the river within recent geological history, this canyon has been filled in with sand and mud.

Great drowned archipelago consisting of 160 flat-topped peaks was discovered between Hawaii and the Marianas by echosounding apparatus.

Ancient Ice Age lake, formed behind an ice dam in the Columbia Plateau Region, is believed to have covered about 4,000 square miles and helped shape the great power area of the Pacific Northwest.

Remains of 100,000,000-year-old reptiles and fossil bones of a 30,000,000-year-old marsupial wolf were unearthed in Colombia.

Ocean water piled up in the vortices of hurricanes was suggested as the cause of microseisms, miniature earthquake waves.

Warning service was planned to save lives and minimize property damage from earthquake-caused sea waves.

Scientifically based surf forecasts can be made, it was revealed.

Diving bells permitted scientists carrying gravity meters to descend 250 feet into coastal waters in search of new off-shore oil deposits.

The season's only West Indian hurricane of any consequence threatened Florida early in October but did no serious damage, there were, however, several typhoons in the western Pacific.

Volcanic Niuafo island, sometimes called "Tin Can Island," erupted.

Pollen grains preserved in the ancient soils indicate that the Carolina "bays" were formed during the Ice Age.

Fossil imprints made about 200,000,000 years ago were identified as marks of the eggs of a sharklike fish, after previously being believed made by ancient palm leaves.

A new dinosaur species, *Gorgosaurus lan-*

census, was based on a skull and spike-toothed jaws.

Special reflectors carried aloft by balloons and traced from the ground by radar gave the speed and direction of winds 100,000 feet above the earth's surface.

A preliminary survey of the Missouri Valley was made as the first of a series of studies to save nature's fossil records and the remains of ancient man's habitations from new man-made dams threatening to flood historic archaeological and paleontologic remains.

Weather stations in the Arctic region of the Western Hemisphere were established by the Weather Bureau to improve forecasting within the United States and to increase safety of operations on the international air transport routes

ENGINEERING AND TECHNOLOGY

Motion Pictures of Earth Taken from 65 Miles Above

➤ **STRATOSPHERE** rockets were tracked throughout their flight by high frequency radio waves, motion pictures showed how the earth would look to a man speeding up to 65 miles above the surface in a rocket.

The energy output of a 100,000,000-volt betatron atom smasher was raised to 160,000,000 volts by applying a direct current to the electromagnet as well as an alternating current

The "Bat," a combat missile that guides itself by radar and can follow a moving target, was developed for all-weather bombing.

One of the most complete interruptions of radio communications in history occurred the week-end of July 27 when for several days broadcasts failed to get through to Europe.

Use of microwaves in radio relay systems was announced as a practical way of simultaneously transmitting large numbers of telephone, telegraph or facsimile signals

Radiotelephone equipment was installed in taxis, buses and service trucks.

New vacuum tube amplifier, known as the traveling wave tube, showed promise of transmitting 100,000,000 words a minute by telegraph, 10,000 cross-country telephone conversations at the same time, and dozens of simultaneous television programs

Silver painted on a plate was used instead of wire for miniature radios.

Color television by an all-electronic means was demonstrated.

Thin aluminum coating applied inside the face of a cathode ray tube resulted in clearer television pictures.

"Sofar," deep sea sound system for locating by underwater explosion ditched planes or life rafts in the open sea as far as 2,000 miles from shore, was announced.

"Sonar," highly developed system for echoing sound waves sent out under the ocean's surface and used during wartime to detect submerged submarines, was revealed.

"Sodar," a radar-like device probing the atmosphere immediately overhead was developed experimentally; it may have application in predicting weather.

Instrument to measure accurately the power of microwaves depends upon the temperature rise of water through which the waves are passed, it was revealed.

Photographs were taken, processed and

projected on a screen in 15 seconds by an automatic camera developed for rapid recording of scientific data.

Smokeless coal furnaces in which coal is converted slowly to coke before consumption were developed.

Extraction of oil from shale in the ground by electrical distillation was announced, supersized tomatoes and other vegetables were grown on the heated ground.

Sound spectrograph, a visible speech device for deaf persons, translated sound into a visual pattern.

Bazooka-style blasting charges for hard-rock mining promised higher efficiency, lower costs and greater safety.

Powerful rocket motor, "Moby Dick," with a thrust one-third greater than the push behind V-2 rockets, reached the experimental stage.

Rusted cast iron chips were used in a new process for taking dissolved silica from boiler water.

New-type streamlined 6,000 horsepower locomotive used constant pressure turbosuperchargers to increase engine efficiency.

Locomotives powered by coal-burning gas turbines, capable of producing from 4,000 to 8,000 horsepower in a single cab and costing no more than diesel-fired locomotives, were developed.

Synthetic aircraft lubricant with a lithium base was made for use over a temperature range of 100 degrees below zero to 300 degrees above, silicone oils, suitable for use as hydraulic fluids in aircraft systems, were developed to flow at from 121 degrees below zero to 302 degrees above zero.

X-ray detective, first all-purpose tool for measuring X-radiation and capable of recording the smallest X-ray units known, was developed.

Radio beams were focussed into a sharp beam by a new metal lens, useful in microwave radio relay systems.

Contacts were made over a range of 31 miles in the first use of super-high frequency microwave bands by radio amateurs

Facsimile transmission of pictures and printed pages through the air by radio microwaves was accomplished between New York and Boston by the use of six automatic relay stations.

Use of wire-mesh shades and an electric filter improved radio reception near fluorescent lamps.

Self-healing electrical condensers, in which zinc deposits reestablished damaged insulation, were made available for radio, radar and other electronic equipment.

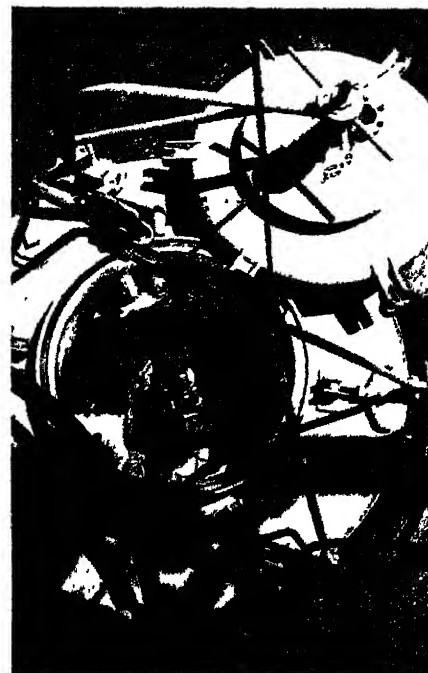
Construction of a field teletypewriter that sent impulses shaping the actual letters was revealed

Oil wells, non-productive because of intruding natural gas, were returned to normal production with a "plastic plug" that seals off the gas.

More oil was extracted from cottonseed at less cost by using a solvent process instead of hydraulic presses

Oil burner that produces a completely white flame was developed for industrial and other large heating and power plants.

Motor fuels were made synthetically from fermentable sugars, obtained from corn cobs, peanut shells, sugarcane bagasse, hulls of oats, cottonseed and other farm wastes.



DIVING BELL—Six-foot diving chamber, just returned from a trip to the ocean bottom, is shown on the stern of the oil exploration ship of the Standard Oil Company (Bahamas). Beside the operator is a gravity meter that gives clues as to the probable presence of petroleum.

INVENTIONS

Electric Towing Car Speeds Plane Takeoff

➤ **NOTABLE** and interesting inventions patented during the year include:

An electric towing-car that speeds the take-off of transport planes.

A fuel for internal combustion engines, consisting of ammonium nitrate in liquid anhydrous ammonia.

A landing strip for rocket-ships, designed to land ultra-high-speed stratosphere craft; it is essentially a large tube closed at one end and with a trumpet-like flare at its open end.

Gas-mask chemical made from the peroxides of sodium, potassium, magnesium and certain organic substances, which renders the worst of known war gases completely harmless.

A centrifuge that by temperature changes separates gases of different molecular weights.

Radar beam reflector that causes ribbon-like beams of electrons to flicker back and forth by rapid modifications in the several electrostatic fields through which it passes.

Synthetically produced myosmine, an alkaloid which improves the taste of tobacco.

Mechanical detasseler that catches corn tassels between a pair of rollers and prevents self-pollination in hybrid seedcorn production.

Weed-killing chemicals, a group of synthetic hormones that act as stimulants in

small doses, but kill plants when sprayed in higher concentrations.

Bazooka-like charges of the high-explosive pentolite, to blast openings in wells for oil flow.

A process for obtaining chlorine from sulfur and salt.

A compound made from glucose and other simple sugars that can be used as an adhesive or conditioner for synthetic sheeting, tobacco and gelatin products.

A fire-and-water-resistant fabric, made from asbestos and cotton treated with chemical solutions of heavy-metal soaps.

A meat-dehydrating machine in which particles of ground meat are blown upward in a blast of hot air and kept moving until completely dry.

A process for coating sheet metal with a solid constituent of natural gas, instead of tin.

An image intensifier, intended to make clearly visible objects in light too dim for good seeing, operated on either infra-red or ultraviolet radiations.

A portable corn dehydrator, to prevent spoilage when corn is cribbed damp, suitable for use in individual farms.

A fluid refrigerant, more complex in chemical structure than Freon, made from tetra-fluoro-ethylene.

A group of sulfa drugs, the sulfapyrimidines, including sulfamerazine, sulfamethiazine and many others.

A method of locating motionless submerged objects by picking up on floating receivers rays sent toward the surface of the sea from deeply submerged fish-shaped containers

Push-button telephone with ten keys arranged in two layers to be used instead of dialing.

A low-cost method for getting vitamin-rich oil out of cod, shark and other fish livers by digesting the ground livers with acid and pensin.

A free-flowing ammonium nitrate, made by thinly coating it with a mixture of rosin, paraffin and petroleum jelly, and mixing with a dry dusty substance.

A method of obtaining a high vacuum by using a beam of X-rays to impose electrical charges on the last few elusive molecules and whisking them out of the way through an electrostatic field.

A straight-line gas turbine for aircraft, that pre-compresses air with a high-speed stub-bladed propeller directly in front.

Mold production of practically pure citric acid by use of a species of *Aspergillus* mold, eliminating costly processes for the separation of by-products formed by previously-used molds.

Electrolytic mining of copper by dissolving native copper with a solution of copper sulfide and sulfuric acid.

A process for extracting peanut proteins from peanut meal left after oil extraction.

A telescope with a small, movable mirror that permits one eye-piece to be used for both the finding and observing objectives.

Noiseless air compressor, using a flux-forming fuel of finely pulverized materials, fed continuously into the blowpipe flame of an oxygen burner.

Automatic timing devices for X-ray photography, using a photocell to break the X-ray circuit and end the exposure.

MEDICAL SCIENCES

United Nations Forms World Health Organization

► WORLD Health Organization was formed under United Nations auspices.

New anti-malaria drugs include pentamquine, or SN 13,276 believed a positive cure; aralen, or SN 7618, manufactured commercially and declared better than atabrine and quinine.

Synthesis of penicillin was announced.

Vitamin A, usually obtained from fish liver oils, was successfully synthesized; two vitamin E chemicals were discovered as effective aids in protecting vitamin A in fish liver oils from oxidation on exposure to air.

First nation-wide test of the use of streptomycin in treating tuberculosis was begun.

New conquests of streptomycin include: cure for rabbit fever or tularemia; improvement of typhoid fever patients; many cases of recovery from urinary tract infections, influenza meningitis, blood poisoning, lung infections, undulant fever, salmonella infections, peritonitis, and Shigella dysenteries.

The new drug, dihydrostreptomycin, was found as active against germs as streptomycin, from which it is derived, and also more stable.

Penicillin saved 11 persons from agranulocytosis, often fatal blood disorder; 25 patients with skin anthrax recovered when treated with the drug; penicillin was found the best cure for mastitis, most prevalent dairy cattle disease.

New penicillin-like drug, erythrin, extracted from the red blood cells of rabbits and other animals was announced as promising remedy in diphtheria and other infections.

Vaccines against parrot fever and rabbit fever were announced.

Nitrogen mustard war gases were tested as possible remedies for some kinds of cancer and cancer-like diseases; patients with Hodgkin's disease temporarily improved after treatment.

Length of time whole blood would keep in storage was shown through use of two radioactive isotopes of iron.

Protection against cyanide gas was found in a pain-easing medicine, para-aminopropiophenone (PAPP).

Bx-war gas chemical, di-isopropyl fluorophosphate, was used to treat glaucoma, blinding eye disease, and myasthenia gravis.

Explosive nature of wounding from high-velocity missiles was recorded by an ultra-high-speed motion picture camera and a microsecond X-ray apparatus; miniature "earthquake" waves caused by the striking bullet were found to break bones not actually hit, damage a wide area of tissues and cause a general shock.

Hydrocephalus, or water on the brain, may be due to the mother's diet being deficient in some substance contained in liver, research showed.

An electronic reading aid which converts printed letters into distinctive sounds, was developed for blind readers.

Biggest infantile paralysis epidemic since 1916 struck the United States with reported cases totalling around 25,000.

Tridione, a new drug, was successfully used to treat petit mal epilepsy.

Ether injections into veins were found effective in relieving painful ischemia in diabetes, Bueger's and Raynaud's disease, and in preventing gangrene.

Some quality of the surface of lung tissue and of other tissue was found to allow white blood cells and other scavenger cells of the body to destroy pneumonia germs without the aid of special antibodies.

Transformation of pneumonia germs from one type to another was accomplished by use of desoxyribonucleic acid.

Injections of cytochrome C, chemical normally present in all living tissues where it functions in oxygen utilization, relieved patients with angina pectoris and intermittent claudication, promised relief in artery hardening, mental disorders and other conditions due to insufficient oxygen.

Denuding the cornea of its outer layer, with the dye fluorescein used to tell when the operation is necessary, was announced as successful treatment for eyes burned by chemicals.

The first mumps vaccine, in the final stages of development, proved successful in immunizing monkeys.

Ringworm scalp infections in children were cured with salicylanilide or copper undecylenate.

New carrier of malaria, the *Anopheles crucians* mosquito, active throughout the southern states, was discovered.

Blood transfusions and penicillin were found to be the best means for combating after-effects of exposure to atomic radiations; liver extract, iron compounds, chemicals derived from the blood's hemoglobin, and one of the new vitamins, folic acid, were tested as possible remedies for atom bomb victims.

Daily doses of the new drug, benadryl, were found to relieve sufferers of hayfever and hives.

Atomic diagnosis of breast cancer with radioactive phosphorus provided a means of detecting malignant tissues in need of surgery.

Hemophilia victims treated with globulin and thrombin from blood plasma survived operations without hemorrhages.

Cutting connections between the frontal lobes and other parts of the brain rendered enduring pain in cancer, spinal nerve root inflammation and tabes dorsalis by removing fear and worry.

Bacteriophage in sugar solution, dripped into a patient's vein, cut typhoid fever death rate 50%.

Two types of skin cancer were successfully treated with radioactive phosphorus, an atomic research by-product.

An antiserum which neutralizes the virus that causes breast cancer in mice was developed, following discovery that the virus is transmitted by mother's milk.

Discovery that adrenal glands respond to stress in a way strikingly different from their response to stress in normal persons gave a new lead to the mental disease problem.

Atomic "tracer" research to determine the safe level of carbon monoxide in airplane cockpits, proved that the gas cannot combine with oxygen to form carbon dioxide in the human body.

Seeing-eye cane for the blind, that detects the distance and direction of obstacles within 20 feet by a radar-like beam of light, was developed to the testing stage.

The Donovan body, germ cause of one kind of venereal disease, was found to cause some cases of arthritis and osteomyelitis.

One of the B vitamins, Para-aminobenzoic acid or PABA, was successfully used to treat typhus fever and Rocky Mountain spotted fever.

Babies stricken with infantile diarrhea recovered when treated with lysozyme, the anti-germ chemical found in saliva, tears and most body fluids.

Raw fish and clams were found to inactivate vitamin B₁₂ from other foods, changing it into a different compound that has no vitamin value to mammals.

Few shipwreck victims can survive immersion for more than one hour in water as cold as 30 degrees Fahrenheit, reports of rescues at sea showed, at temperatures of 68 to 70 degrees immersion of 60 hours or perhaps longer can be survived.

Experiments with rats indicated that lack of milk in the daily diet may influence the development of cancer of the liver.

Success with vitamin E treatment of purpura, rare hemorrhagic disease, was reported.

Lives of children born with a defect of the body's main artery were saved by cutting out the narrowed or closed part of the aorta and sewing the cut ends together.

Blood clots that form on a baby's brain and cause one kind of feeble-mindedness were successfully removed.

Nerve cutting operation brought relief of pain to many sufferers from stomach ulcers.

Furacin, a nitrofur, was introduced as a new chemical remedy for infections.

An outbreak of Q fever was reported as occurring among stockhandlers in Amarillo, Texas.

Rickettsialpox, a new disease, and its cause, a rickettsia were discovered.

Initial phase of an elaborate analytic nationwide survey of child health services was started as a basis for potential legislation recommendations.

Studies of dog blood serum indicated that dogs, particularly in the Eastern part of the United States, may be of considerable importance in the Rocky Mountain spotted fever situation.

Nine specimens of a Louisiana species of fresh-water snail proved susceptible to infection with one of the parasites which cause human schistosomiasis.

Severe bleeding during brain tumor operations was controlled by drawing blood from patient's artery to a reservoir, thus reducing blood pressure and bleeding, and returning blood to the artery after operation.

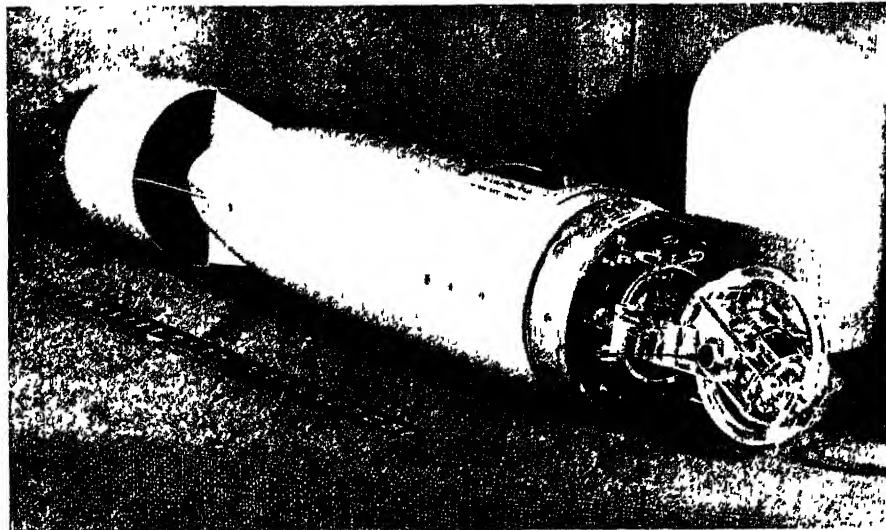
Cure of a case of Addison's disease by graft of adrenal gland from a patient with overactive adrenals which made her a bearded lady was reported.

Muscle strips from abdomen and legs were successfully grafted on heart muscles of dogs, suggesting similar surgery may be practiced for some human heart disease victims.

A new memorial laboratory planned to provide maximum safety for research workers studying infectious diseases was opened at the National Institute of Health.

A special breathing chamber devised for keeping the lungs at rest was tried with promising results in the treatment of pulmonary tuberculosis.

Folic acid and thymonucleic acid were found effective in the treatment of the macro-



DOODLEBUG—This magnetic detector is being used in aerial prospecting for oil and mineral deposits throughout the country.

cytic anemia of sprue and pernicious anemia.

Strenuous exercise was shown to be accompanied by a marked increase in the excretion in the urine of adrenal cortical hormones which affect carbohydrate metabolism.

Three new drugs, carbarsone oxide and two sulfur-containing arsenicals, showed promise for control of chronic amebiasis.

Ferric and ferrous forms of iron when fed in large amounts may be effective in combatting lead poisoning, rat experiments showed.

Poisoning by ethylene dichloride and propylene dichloride can be combatted, in rats at least, by feeding the amino acids, cystine and methionine, it was found.

The metal shadowing technique for microscopy was used to observe submicroscopic antigenic material from epidemic typhus vaccine, directly to study the surface structure of living teeth and to photograph directly with the electron microscope the molecular arrangement in single virus protein crystals.

The Nobel prize in medicine and physiology was awarded Prof. Hermann Joseph Muller, Indiana University, for his discovery of the genetic effects of X-rays: half of the award in chemistry was given to Dr. J. B. Sumner, Cornell University, pioneer crystallizer of enzymes; half was awarded jointly to two scientists of the Rockefeller Institute for Medical Research, Dr. W. M. Stanley for researches on viruses and Dr. J. H. Northrop for work on enzymes and viruses.

PSYCHOLOGY AND PSYCHIATRY

Congress Passed First Mental Health Act

► CONGRESS passed the National Mental Health Act, marking the first time in history that any nation recognized mental health as a serious problem worthy of the attention and money of its government.

The sedative, sodium amytal, psychotherapy and retraining, helped speed the recovery of veterans who through brain in-

juries lost the ability to speak, read, write, or understand language (a condition called aphasia).

Students' chances of making good in college were predicted by the Rorschach ink-blot test, also found useful in warning when a person is reaching the state of mind in which he is likely to commit murder or suicide.

Problem children with abnormal brain waves were made to behave better by a new drug, dilantin.

Hang-overs were found to be the most effective periods for psychological treatment of alcoholics.

Lactic acid, adrenalin, and medically induced delirium were successfully used in treating, respectively, depressions, anxiety states and borderline psychiatric disorders.

A cancer extract that both destroys cancer in rats and makes the animals immune to further cancers was reported.

Finger-painting was used to diagnose and treat two mental diseases, schizophrenia and paranoia.

Extreme race haters are on the verge of mental imbalance, blaming a racial group for their own shortcomings, questionnaires and psychological tests showed.

Children suffering from the severe mental sickness schizophrenia were found to have a better chance of getting well when treated at the doctor's office than when sent to a mental hospital.

Prevention of schizophrenia in some cases by removal of frustrations was declared possible on the basis of studies in which removal of frustration brought recovery, while reintroduction of the frustrating situation brought recurrence of the illness.

Aches, pains, fatigue and lack of energy may come from emotions and attitudes, frequently aroused by marital or work difficulties, studies of patients showed.

Middle-class children are more often made neurotic by the conflict between submissive and aggressive drives than are lower-class children, studies indicated.

Mothers over-anxious to have their three- and four-year-olds do well are inclined to boss them around so they do not have a

chance to do anything on their own, a study of mother-child groups showed.

Mental and emotional control of the appetite, more than glandular treatments, were found important factors in losing weight.

Glutamic acid raised the I. Q. in certain types of mental deficiency.

Juvenile delinquents were declared to be neurotics in need of psychiatric treatment.

Army experiences with mental breakdowns indicated that successful treatment depends upon finding and changing the cause of unbearable stress.

Feeble-mindedness tends to be sporadic and not greatly associated with family feeble-mindedness, while schizophrenia may occur in families of at least half the patients with this mental disease, studies of the heredity of mental disease showed.

Many, if not the majority, of accidents are caused by personality difficulties of the injured, with depression, over-excitement, drunkenness, anxiety, fear or anger as contributing emotional causes, accident studies indicated.

First experiment in democratization was carried on with some success among German prisoners of war at Fort Getty, R. I.

Noise was found in tests with intense airplane noises to have little effect on most types of mental, motor and psychological activity.

A survey of the stages of psychological growth in normal children from five to ten years of age was completed

Science News Letter, December 21, 1946

GENERAL SCIENCE

Ten Important Science Advances of Year Picked

► THE TEN most important advances in science made during 1946, as picked by Watson Davis, director of Science Service, are:

1. Distribution of radioactive isotope varieties of common chemical elements, made in chain-reacting atomic pile, for research and medical use.

2. Synthesis of penicillin and of vitamin A.

3. Revelation of biological warfare developments, including vaccine against rinderpest, and isolation of botulinus toxin.

4. Photography of solar spectrum

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above ozone layer by flight of a V-2 rocket into upper atmosphere.

5. First flight of supersonic plane XS-1 and other rocket and jet propulsion advances not fully revealed.

6. Production of antimalarials, chloroquin, declared better than atabrine and quinine, and pentaquine, believed positive cure for vivax malaria

7. Prediction and observation of the Giacobini-Zinner meteor shower, and artificial meteor shower from V-2 rocket.

8. High voltage machines, including first operation of frequency modulated supercyclotron, beginning of linear accelerator and synchrotron, and betatron improvements.

9. First births of animals from foster mothers into which were transplanted ovaries from other animals.

10. Organization of U. S. Atomic Energy Commission, UNESCO, and World Health Organization.

Science News Letter, December 21, 1946

NUCLEAR PHYSICS

Giant Cyclotron To Be Built At Columbia University

► A GIANT atom-smasher for peacetime research in atomic energy will be completed at Columbia University in 1948. The new instrument is a cyclotron which accelerates protons up to an energy of 300,000,000 electron volts or more.

The atom-smasher will be housed in a new building on the grounds of Columbia's estate, "Nevis," at Irvington-on-Hudson. Both the cyclotron building and a two-story physics building for control rooms, research laboratories and space for instrument development are scheduled to be completed late next year.

Columbia has a Navy contract for cyclotron research, and trustees of the university have appropriated \$550,000 for construction of the buildings.

Weighing 2,500 tons, the new atom-smasher will have an electromagnet built of 2,000 tons of steel and 150 tons of copper. Other equipment with a weight of 350 tons will be included. Particles of matter will reach a speed of 130,000 miles per second in the new cyclotron. Dr. I. I. Rabi, Columbia University physicist and Nobel Prize winner, has expressed hope that the new cyclotron might be able to produce the mesotrons which thus far have been found only in cosmic rays. Other investigations planned with the new atom-smasher include studies of ultra-high energy protons, neutrons and radioisotopes.

Science News Letter, December 21, 1946

Do You Know?

In the Philippines the main rice harvest is in December.

Nicotine is one of the most toxic of all drugs and acts with a rapidity comparable to cyanide.

More than \$5,000,000 worth of timber was lost to the housing program through forest fires in 1945.

Goatskins that have to be inflated for each trip support rafts ferrying Chinese across the rivers.

A new and effective antidote for arsenic poisoning, known as 2,3-dithio-propanol, is reported found.

Poisonous plants growing in pastures cost farmers \$15,000,000 every year in livestock losses, it is estimated.

Assembly-line techniques appeared in the automobile industry in 1904; large-scale mass production really began four years later.

The weedkiller 2,4-D will injure hedges, plants and trees unless steps are taken to prevent drifting of the chemical to the desirable plants bordering the lawn where it is used.

The virus present in one-millionth of a cubic centimeter of blood drawn from a cholera-infected hog is sufficient to infect another hog with the disease; a teaspoon holds about 3.6 centimeters.

The black widow spider pierces its victims by means of special sharp claws through which venom is discharged from a poison gland opening at the top of each claw.

If Abraham Lincoln's father had used sawed lumber instead of logs, the same amount of timber in the cabin Abe was born in could have built 4 modern homes.

Someone has said the famous Washington monument, District of Columbia, is sinking into the ground at a rate of 1/40-inch per year; if this is so, and the rate continues, the apex of the 555-foot obelisk will be level with the ground in 266,400 years.

PALEONTOLOGY

Borhyena, Lunch Found

➤ ABOUT 30,000,000 years ago a fantastic beast in what is now the Magdalena valley, in the republic of Colombia, gobbled up a small rodent, and lay down to lick his chops.

He never got up. Something hit him, and he was buried under a pile of fine sand before he had finished digesting his lunch.

Today University of California paleontologists are studying the fossilized remains of both him and his last snack.

The beast, the like of which has never been found either living or in the boneyards of science, falls within the genus technically known as *Borhyena*. He was a carnivorous marsupial, with the habits of a wolf or hyena. Opossums and kangaroos are the types of marsupials surviving today.

Borhyena's lunch was not discovered by the scientists until the sandstone that froze him in his dying pose was carved away from his bone structure. Where his intestines should have been was a rodent belonging to a prehistoric

group of animals related to the porcupine and guinea pig. The rodent's bones are somewhat chewed up, apparently from *Borhyena's* molars, but the small animal had been only partially digested.

Dr. R. A. Stirton, who brought the specimen to Berkeley last year, says the fossil is an unusual one. Intestinal remains are seldom found in a specimen, since fossilized animals were seldom covered up immediately and consequently the remains were widely scattered. *Borhyena* is also unique in that all his pieces are already in place, and he doesn't have to be fitted together like a jig-saw.

Borhyena is one of 28 rare species brought back to Berkeley by Dr. Stirton. Only three of the species have been reported by scientists before.

Dr. Stirton explains that northern South America is almost unexplored so far as fossils are concerned, and that because of the long isolation of the continent many animals developed unique characteristics not found elsewhere.

Science News Letter, December 21, 1946

DENTISTRY

Preventing Tooth Decay

➤ WE MAY BE on the threshold of a new age of freedom from tooth decay with a consequent revolutionary change in dentistry.

This cheerful view of the future was given by Dr. H. Trendley Dean, dental director of the U. S. Public Health Service, at the Third Annual Seminar of Dental Medicine.

"The fanciful dream of yesteryear, inexpensive mass control of dental caries through a communal medium, has begun to take shape as a reality of tomorrow," Dr. Dean declared.

Fluorination of the water supply is the means by which this dream may become reality within five to 10 years. Dental and health authorities consistently find less tooth decay where the drinking water contains at least one part per million of fluorine, and a high rate of tooth decay where the water contains less than this amount. When the concentration goes above this, the disfiguring tooth condition of mottled enamel occurs.

The fluorine does not accumulate in the bodies of those drinking fluorinated

water and it does not cause any harmful effects at the concentrations used to banish tooth decay. It achieves its effect on teeth during the first eight years of life when teeth are being formed, Dr. Dean said. It is not known how fluorine protects teeth from decay.

Experiments on mass fluorination of water are now being carried on at Grand Rapids, Mich., Newburgh, N. Y., Brantford, Ont., Midland, Mich., and Sheboygan, Wis. Conclusive results from these tests should be available within five or 10 years and will determine, Dr. Dean said, whether or not fluorination will become a common practice the world over.

Science News Letter, December 21, 1946

DENTISTRY

Sodium Fluoride Swab Reduces Tooth Decay

➤ SWABBING sodium fluoride on the teeth of school children reduced tooth decay 40% when the treatment was given three times, four Minnesota dentists report in the *Journal of the Amer-*

ican Dental Association (Nov.).

The dentists are Drs. W. A. Jordan and Vern D. Irwin of Minneapolis; Dr. O. B. Wood of Virginia and Dr. James A. Allison of Hibbing.

Sodium fluoride has previously been shown able to prevent tooth decay when it is in the water children drink during the years when their teeth are developing. Its use as a treatment applied to the teeth after they have erupted has more recently been studied by several scientists.

Best results, the Minnesota dentists believe, will be obtained when children are given from four to eight treatments. For permanent teeth, two treatments gave more than twice as good results as one treatment, and three treatments gave twice as good results as two. Since the amount of tooth decay was reduced only 40% by three treatments, the dentists believe four or more treatments would give still better results.

The treatment consists in thorough cleaning of the teeth by a dental hygienist and application of a 2% solution of sodium fluoride by the dentist. After the sodium fluoride is applied, the child waits four minutes for the solution to dry. The entire treatment takes about 15 minutes of the child's time and an average of 50 can be treated in a day.

Total cost for treatments averaged \$1.60 per child.

In the study, only half the teeth in each child's mouth were treated, the others being left as controls. A year after treatment the dentist who made the pre-treatment examination examined the child again to determine the amount of new decay in both treated and untreated teeth.

Science News Letter, December 21, 1946

Of the forty-odd species of *scorpions* found in the United States, only two are known to possess a deadly neurotoxic venom.

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Older than Christmas

See Front Cover

➤ CHRISTMAS TREES give many children their first intimate contact with trees of any kind, and hence their first chance to learn something about trees. Not that this first lesson in dendrology goes very far: the little spruce or fir is out of its natural environment and is bearing very strange fruit, and the child is usually too much excited over gifts and lights and tinsel to look very closely at the branches that hold them up.

Nevertheless, with the tree standing there for a week or more, it is inevitable that it will impress itself upon the consciousness of even a toddler as an object in a definite class, so that the next time

he sees a similar one outdoors he will very likely point and say, "T'ee!"

It is appropriate that a child's first acquaintance with trees should be with an infant conifer, for conifers—the pines, spruces, firs and their relatives—belong to the childhood of the world. They were here when the world was young, before the more varied but less hardy brotherhood of oaks and elms and maples and other broad-leaved trees came into existence.

Half-a-billion years ago, when coal was still in the making, and millions of years before the first dinosaur pipped its eggshell, there were trees with needle-foliage very similar to that of present-day spruces and firs.

The venerable antiquity of conifers was once very aptly expressed in a poem:

"The lordly pine was first to come
And will be last to go."

Even yet the coniferous trees bear in their bodies the marks of their high antiquity, for in a thousand details they are more primitively built than are the broad-leaved trees that came into the world later on. The "lordly pine" and its kindred are a society of conservatives, that insist on holding to old-fashioned ways of doing things—and manage to get along all right, at that.

The more progressive, later-evolved broad-leaved trees are able to get the better of the conservative conifers in competition for the most favorable lands of the earth, where living is easiest. But where the going is tough, as in the Far North, up high mountain slopes and on barren, sandy lands, the conifers hold their own.

Oldsters and youngsters on a Vermont hillside are shown on the cover of this SCIENCE NEWS LETTER. The deep snow has all but covered the spruce sproutlings, not yet of Christmas tree size, in the foreground of this U. S. Forest Service picture.

The needle-shape of their leaves is what enables them to stay green all year round. Winter winds merely whistle weirdly through the needles. If broad-leaved trees were exposed to such winds, they would have their foliage badly torn, probably suffer the loss of branches as well. That is what does happen to them when they are in leaf and a tornado or a hurricane strikes.

The toughness and restricted area of conifer needles may make them less efficient food factories than broad leaves are, but they do have the advantage of always being close-reefed when adver-

sity strikes. That may be one reason why needle-leaved trees dominate the stormy frontiers of the earth, where adversity is an everyday matter.

Living with the wind as much as they do, conifers have found ways of making the wind work for them. For one thing, the wind carries all their pollen; no conifer depends on insects to transfer this vital fertility-dust. Dependence on wind pollination was probably obligatory for those earliest conifers, a half-billion years ago. Insects existed then, but it is rather unlikely that any of them were pollen-carriers.

It is worth noting in passing, incidentally, that the broad-leaved trees and shrubs that do outpost duty along with conifers in the hardship areas of the world—notably willows, aspens and alders—are likewise wind-pollinated trees of ancient lineage and conservative habits.

Science News Letter, December 21, 1946

BOTANY

Elixir of Love Exists For Some Lower Plants

➤ THE ELIXIR of Love, vainly sought by medieval alchemists, actually exists—for certain microscopic lower plants. It is a compound known as crocetin, together with a few of its chemical derivatives. One part of this in 250 trillion parts of water will cause cells of the plant to quit a quiet, sedentary, sexless phase of existence and become actively motile, mate-seeking sexual cells.

The plant concerned is the one-celled lower alga called *Chlamydomonas*. Details of its astonishing sex-chemistry are presented in the *American Journal of Botany* by Prof. Gilbert M. Smith of Stanford University. Others have also carried on research in this field, most notably a botanist named Prof. F. Moewus, in pre-Hitlerian Germany.

The sex-life of *Chlamydomonas* also presents another dizzying peculiarity. The clever poet who tossed off the couplet:

"Breathes there a man with soul so tough

Who says two sexes are not enough?"

should have studied a little botany. This plant has not two sexes, but ten. It produces five types of female cells, and five of male, all reacting with different degrees of intensity to their opposite numbers. All of which makes life at that level rather confusing.

Science News Letter, December 21, 1946

YOUR HAIR AND ITS CARE

By O. L. Levin, M. D. and H. T. Behrman, M. D.

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Books of the Week

APPLIED PHOTOGRAMMETRY, Fourth Edition—R. O. Anderson—*Published by the author*, 518 p., diagr., \$6. This edition is an attempt to incorporate the three former editions under one cover, and to cover cases of higher tilt and relief than formerly treated.

THE ATOMIC BOMB—Julia E. Johnsen—H. W. Wilson, The Reference Shelf, Vol. 19, No. 2, 335 p., \$1.25. An attempt to present the factual background and other helpful material which might contribute to an understanding and to constructive thought and discussion of this vital subject. The Reference Shelf presents collections of articles and bibliographies on timely subjects.

CHARLES DARWIN and the Voyage of the Beagle—Lady Nora Barlow, ed.—*Philosophical Library*, 279 p., illus., \$3.75. Unpublished letters and notebooks of Darwin to his family during his famous five-year voyage, which gave an intimate record of his emotional and intellectual development as a young man.

THE DECIBEL NOTATION Its Application to Radio and Acoustics—V. V. L. Rao—*Chemical Pub. Co.*, 179 p., illus., \$3.75. A book which explains the origin, development and a wide range of applications of decibel notation, with special reference to radio engineering and acoustics.

GARDENING WITH SHRUBS AND SMALL FLOWERING TREES—Mary Deputy Lamson—*Barrows*, 295 p., illus., \$2.75. A complete guide to purchasing, upkeep, pruning and transplanting of shrubs, including those desired for bloom, fruit, foliage, fragrance and for winter color, also evergreens and wall shrubs.

THE HISTORY AND ROMANCE OF THE HORSE—Arthur Vernon—*Dover Publ.*, 525 p., illus., \$3.50. Traces the development of the horse from the prehistoric "dawn horse" to the present-day horse, giving ten phases of equine life and history for encyclopedic use and pleasant reading.

INVENTIONS AT YOUR SERVICE: Important Patents Available to the Public Free of Charge—Albert J. Kramer—*Progress Press*, 139 p., \$5. This book contains abstracts of all the important patents obtained by the U. S. Department of Agriculture during the past 16 years (exclusive of 1946). The book tells you what they are and how they may be used in your business, home and farm.

LIST OF Sires Proved in Dairy-Herd-Improvement Associations, 1946—Compiled by the Division of Dairy Herd Improvement Investigations, Bureau of Dairy Industry, Agricultural Research Administration—*Govt. Printing Office*, 130 p., paper, 25 cents U. S. Department of Agriculture Misc. Publ. No. 613. Oct. 1946.

LIVING TOGETHER IN THE FAMILY—Mildred W. Wood—*American Home Economics Assoc.*, 256 p., illus., \$2. This high school textbook aims to show that successful family living cannot be accomplished without an effort, that it can be achieved only through the cooperation of all members of the family—the children as well as the parents.

NEW GUINEA HEADHUNT—Caroline Mytinger—*Macmillan*, 441 p., illus., \$4. An exciting and entertaining adventure of two American women who went to New Guinea to paint portraits of the Papuans and preserve a record of an early type of man which is rapidly becoming extinct. They give much anthropological material, as well as a lively and humorous account of their adventures.

NURSING CARE IN CHRONIC DISEASES—Edith Marsh—*Leppincott*, 237 p., illus., \$3. The author of this book strives to make the care and the rehabilitation of the "hopeless" patient as essential and interesting as the care of any acute case.

REHABILITATION OF THE TUBERCULOUS Proceedings—Conference on the Rehabilitation of the Tuberculous—Holland Hudson, Ed.—*National Tuberculosis Assoc.*, 138 p., paper, \$2. A condensation of the major subjects discussed by participating members of the conference.

SCIENCE Its Effect on Industry, Politics, War, Education, Religion and Leadership—D. W. Hill—*Chemical Pub. Co.*, 114 p., \$2.75. An optimistic, reassuring volume for those who worry about scientific progress and its relation to world affairs. It attempts to show that the aim of science is to assist and not to destroy mankind.

STANDARDIZATION AND INSPECTION OF FRESH FRUITS AND VEGETABLES—Raymond Spangler—*Govt. Printing Office*, 28 p., 10 cents U. S. Department of Agriculture Misc. Publ. No. 604.

A TEXTBOOK OF QUALITATIVE ANALYSIS (Using the Semimicro Method)—W. B. Meldrum and A. F. Daggett—*American Book Co.*, 431 p., illus., \$3.50. Presenting in well-balanced treatment the theoretic concepts best applicable to the procedures and results of qualitative analytical chemistry, and preferred techniques for the detection of inorganic constituents of materials.

THE THYROID GLAND IN MEDICAL HISTORY—Alfred H. Lason—*Froben Press*, 130 p., illus., \$3. All peoples since earliest times have evidenced a belief in a close, indissoluble bond between man and the lower animals. This is a historical account of this belief and the relationships between various organs of animals and man to the medical welfare of man, especially the thyroid gland, and the men who did research in this work.

Science News Letter, December 21, 1946

AERONAUTICS

Family Flying to Wait On Low-Cost Production

► **FAMILY FLYING** with helicopters from backyard airports will have to await the development of low-cost mass production.

The chief immediate use of helicopters is in supplementing air transport service carrying mail and express, with passen-

ger shuttle a close second, Edward Nesbitt, United Aircraft Corp., told the Society of Automotive Engineers.

Helicopters have proved their worth, he said, in transporting passengers and cargo, especially mail, on short flights, and in rescue projects.

Helicopters can expedite air mail service four to 24 hours, and can serve the excellent function of bringing airports closer to cities, making airplane-helicopter combinations faster than ground transportation over distances as short as 28 miles. Helicopters now have a speed better than a mile-a-minute.

Science News Letter, December 21, 1946

ARCHAEOLOGY

Bulldozer Digs Fossil Mammoth, Mastodon Bones

► A **BULLDOZER** was successfully used in a rapid "dig" for fossil bones of mastodon and mammoth, turning up in one day 200 or more specimens worth preserving, at Lower Blue Licks Spring, Ky., Dr. W. R. Jillson of the University of Kentucky reports in *Science* (Dec. 6).

The mammoth hunt was sponsored by Maj. Victor K. Dodge, who paid all costs personally. A crowd of about 650 people watched the unusual operation.

Science News Letter, December 21, 1946



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• New Machines and Gadgets •

⚙️ **SPEED controller**, for hoisting and lowering winches on heavy cantilever cranes, is a mechanism which automatically "weighs" the load being carried, and hoists and lowers it at the fastest safe speed. The lighter the load, the higher the speed permitted.

Science News Letter, December 21, 1946

⚙️ **CAR JACK**, of the bumper type, is a hydraulic device weighing only 10 pounds because made of an aluminum alloy. It has a leakproof oil reservoir to prevent soiling hands or clothes. Nearly 30 inches in height when ready for use, it has a 16-inch lift.

Science News Letter, December 21, 1946

⚙️ **FOLDING staircases** for the rear of trucks provide two easy steps for the convenience of workmen. They are attached to the under side of the platform body, and when not in use fold neatly under the floor of the truck, completely out of the way.

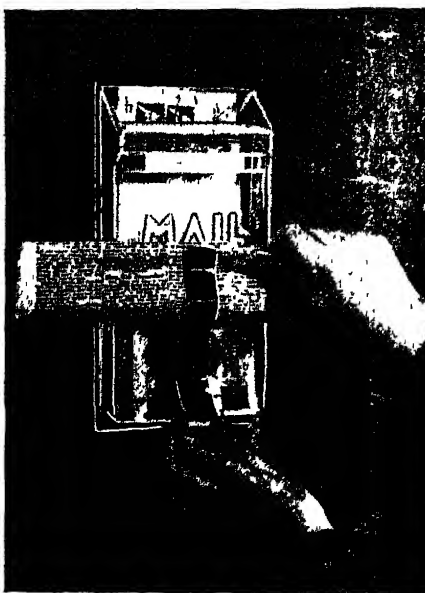
Science News Letter, December 21, 1946

⚙️ **PAPER DRAPERIES** for the home, which look and feel like fabric, come ready for the ordinary curtain rod. They are strong, soft, flexible and long-lasting, it is claimed. They can either be dusted with a soft cloth, or spread on a hard surface and freshened with wall-paper cleaner.

Science News Letter, December 21, 1946

⚙️ **BABY high chair**, made of aluminum and plastic, can be folded into a convenient package for traveling. By substituting back hooks for legs, the device becomes a safety car or airplane carrier for a child.

Science News Letter, December 21, 1946



⚙️ **TRANSPARENT mailbox**, made of plastic, shows at a glance whether the postman has left letters. It has a hinged bottom and a long flexible strip of aluminum to hold newspapers as shown in the picture. The acrylic-resin withstands weather changes and hard knocks.

Science News Letter, December 21, 1946

⚙️ **WALL-WASHING machine** for the home is designed to wash, rinse and dry all types of walls. It has separate pressure tanks for wash-water and rinse-water, with hose connections to pads called trowels, which scrub and rinse. The water is fed to the trowels by fingertip control from the tanks.

Science News Letter, December 21, 1946

⚙️ **ROOM DEODORIZER**, for home, office and sickroom use, comes in a plas-

tic case that resembles a small radio receiver. It utilizes an electronic ionization tube to develop ozone to kill smells from cooking or smoking. Ozone, a form of oxygen, is both a deodorizer and air-freshener.

Science News Letter, December 21, 1946

⚙️ **PILLOWS** filled with glass fiber are offered for persons allergic to feathers. The fibers are extremely fine and fabricated into resilient batts. Tests show that this light, pliable, moisture-resistant material does not break with long use and no ends penetrate the pillow ticking.

Science News Letter, December 21, 1946

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Question Box

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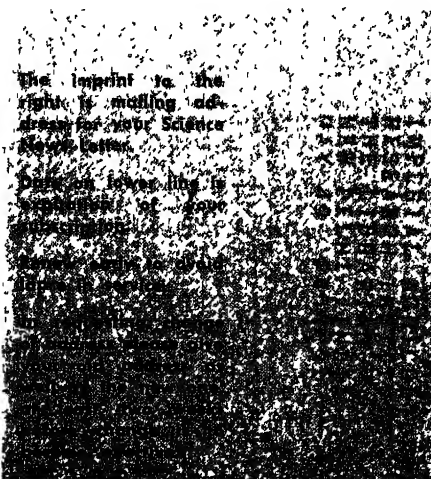
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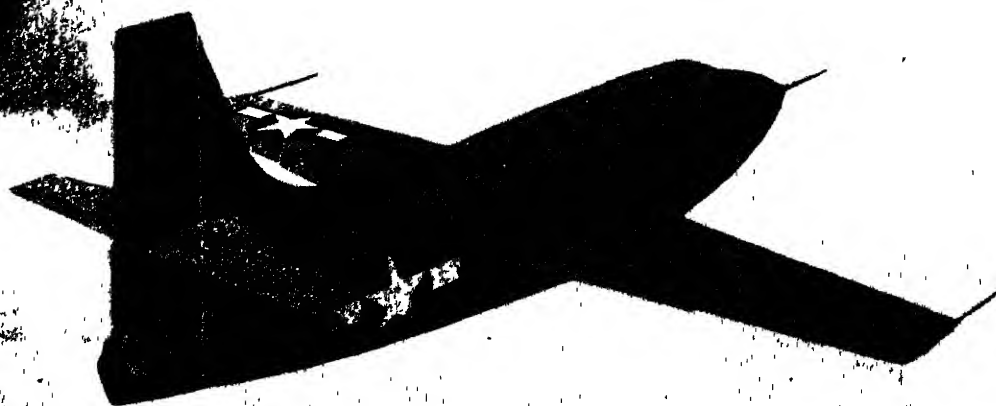
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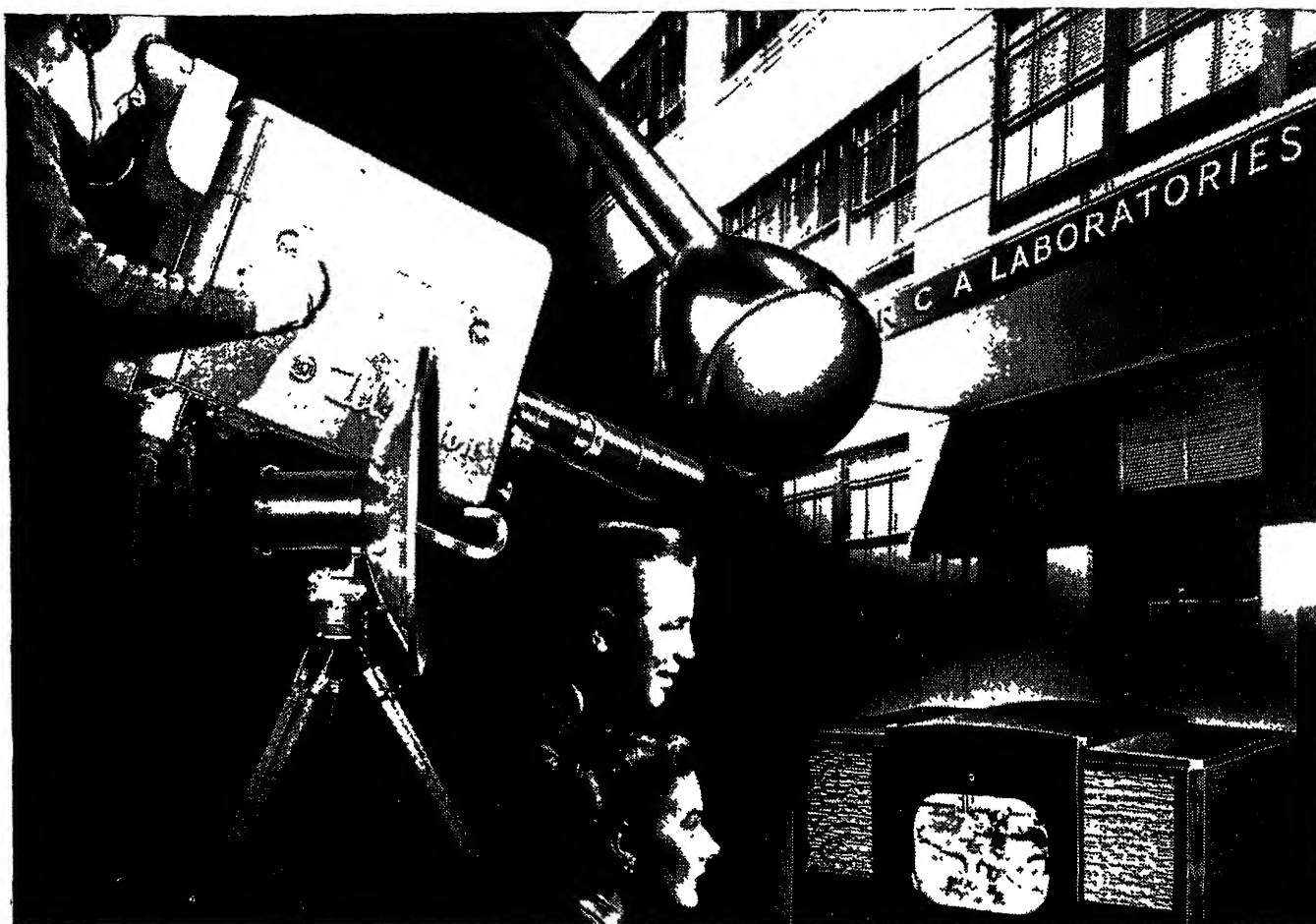
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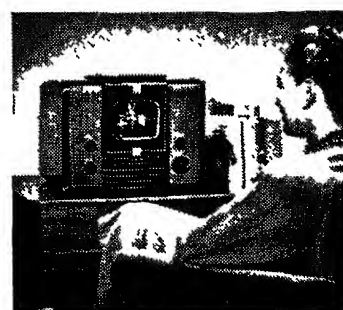
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RADIO CORPORATION of AMERICA

MEDICINE

Lucite Tubes Mend Aorta

Plastic segments are stitched with specially braided silk to artery carrying blood directly from heart. Rubber balloon holding mercury may save intestines from gangrene.

➤ A NEW KIND of spare part for the human body, tubes of lucite, the modern plastic, may be used by surgeons of the future to repair the big artery that carries blood directly from the heart.

This possibility appears from experiments reported by Dr. Charles A. Hufnagel of Boston at the meeting of the American College of Surgeons.

Segments of this big artery, called the aorta, measuring one to three centimeters long were replaced by highly polished lucite tubes in animals. The tubes were held in place by stitches of specially braided silk.

These spare parts were still firmly united to the rest of the artery six months later. The artery with its lucite tube section functioned satisfactorily in carrying blood, and no drugs, such as heparin or dicoumarin, were needed to prevent clotting of the blood.

An inch and a half long rubber balloon with a little mercury in it may save lives of patients threatened by peritonitis and gangrene of the intestines. The balloon is put up the patient's nose and down his throat, through the stomach and all the way down the intestines, if necessary. It is attached to a long rubber tube with several holes in it near the balloon end. Object of the tube is to enable the surgeon to suck out through it fluid and semisolid material which a cancer or some other obstructing condition may prevent passing in the normal way.

The use of mercury in such tubes was developed by Dr. Meyer O. Cantor of Detroit. The weight of the mercury and

even more its tendency to run together makes it ideal, he believes, for carrying the tube along the up and down course of the intestines.

The object of this and other methods for removing the obstructed material is to prevent its cutting off circulation in the walls of the intestines, following which gangrene may set in. With the material removed, the surgeon can safely operate to correct the underlying cause of the obstruction.

Prevention rather than salvage is the new order in surgery for future battlefields and for civilian injuries and disasters, Dr. Edward D. Churchill of Boston declared.

This is the chief, and so far little discussed, surgical lesson from the war that ended with the atom bomb explosions over Japan. By studying the pattern of injury, such as was seen in the atom bomb explosions, in the Coconut Grove fire in Boston and in other disasters, surgeons will be able to devise methods of preventing injury.

Much is already known about how weapons injure and how wounds from various types of weapons are distributed. If these facts are applied to development of body armor, such as flak suits, the number of those killed in action might be reduced by 12% and of those wounded by 8%, according to figures quoted by Dr. Churchill. The development of the crash helmet of the British army by a neurosurgeon is another example cited for the possibilities of preventive rather than salvage surgery.

Science News Letter, December 28, 1946

MATHEMATICS

Particle Energy Tackled

➤ A COMPLEX mathematical struggle to explain how primary particles of the universe can escape the necessity of having infinite energy has won for a 28-year-old physicist from Ceylon, Dr. Jayaratnam Eliezer, the \$2,000 Mayer Award administered by the National Science Fund of the National Academy of Sciences.

A high-powered award jury pro-

nounced the 35-page, equation-filled contribution a "profound and comprehensive treatment" of the major problem of the interaction of particles with an electromagnetic field. What place the prize paper will have in the final solution of the problem, the committee is not sure.

The dilemma that Dr. Eliezer attempts to solve is that modern physics does not allow primary particles to have a space

structure, but that as soon as a particle is assumed to be point-like its self-energy becomes infinite. Classical physics has ways to get around these infinities, but quantum theory finds it more difficult. That is the problem attacked.

Dr. Eliezer is now a research fellow at Christ's College, Cambridge, England, where he had previously studied with Prof. P. A. M. Dirac, one of the founders of modern physics.

Science News Letter, December 28, 1946

CHEMISTRY

Carbon 13 Is Available For Cancer Research

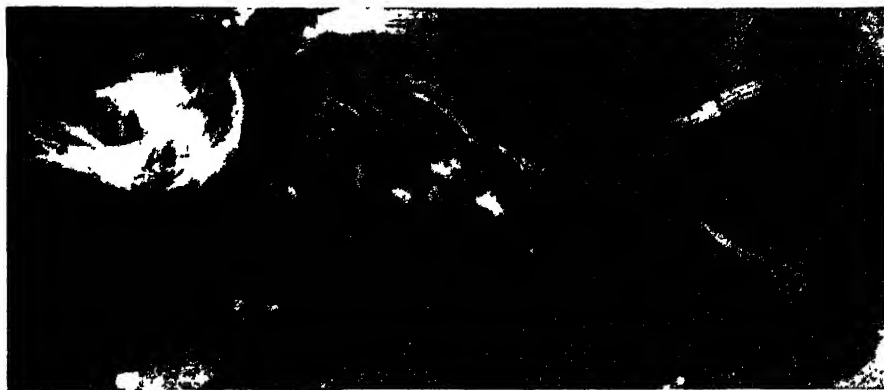
➤ AVAILABILITY of carbon isotope 13, first shipped by Kodak Research Laboratories to New York's Memorial Hospital, will make it possible for research scientists to tag the carbon on two sides of a chemical or physiological reaction.

This may speed understanding of what happens in cancer, which is the main research problem at Memorial Hospital. The new carbon variety weight 13, produced by a chemical exchange method, supplements the radioactive carbon 14 made in the chain reaction atomic pile at Oak Ridge, distributed for research a few months ago.

Science News Letter, December 28, 1946



IN THE MAKING—Carbon 13 is being made in the fractionating column. Dr. William O. Kenyon (right) of the Kodak Research Laboratories is holding a bottle containing some of the rare isotope used in medical research.



GHOSTLY FOSSIL—X-rays reveal the pattern of fish bones embedded in shale slab. Photograph by Fred Anderegg, Princeton, N. J.

PALEONTOLOGY

X-Rays Detect Fossils

► X-RAYS are being used in the laboratories of Princeton University to study the fossils of hundreds of small fish found embedded in a shale deposit when excavations were being made for the University's new library building. This novel use of X-rays not only saves many hours of tedious scraping and brushing ordinarily used to lay bare rock-embedded fossils, but it brings out fine details of the bony structure that the usual technique fails to disclose.

When a slab of shale suspected of harboring a fossil is split, the faint outlines of a fish may appear on the freshly exposed surface. Instead of going on with the chip-scrape-and-brush technique, the slab is then placed on a film holder and exposed to X-rays. When the film is developed the entire skeleton shows up in minute detail. Usually the head is strongly outlined, with the body bones, fins and tail in ghostly tracery.

With only a few exceptions, the fossils found in the Princeton campus excavation are of a species known scientifically

as *Osteoplaurus newarki*, belonging to the ancient order of fishes called the coelacanths. The specimens are all small, ranging from one to eight inches in length. One prominent characteristic in which they differ from modern fishes is a third lobe projecting from the middle of the forked tail. Their scales seem to have been covered with sharp prickles—doubtless making them uncomfortable morsels for bigger fish to swallow.

These fish lived far back in the Triassic period, towards the end of the Age of Dinosaurs, when what are now layers of shale and related rocks underlying New Jersey's present low hills were soft mud on the bottom of the sea. Fish that died sank to the bottom, were covered with more mud; then more fish died and still more mud covered them, until there was a vertical layer-cake of death. Still deeper burial and resulting heavier pressure, continued for ages, hardened the mud strata into layers of shale, with the now fossilized remains of the fish sandwiched between them.

Science News Letter, December 28, 1946

MEDICINE

Health Centers for Lepers

► LEPERS won't be treated like lepers when recommendations of the advisory committee on leprosy to the U. S. Public Health Service go into effect. And the 2,000 to 3,000 lepers now roaming at large will be found and given the benefit of modern effective treatment for the disease.

The National Leprosarium at Carville,

La., should be replaced by four Public Health Service special treatment centers, the committee advised at the close of its two-day session.

The special treatment centers for leprosy should be located, one each, in California, Texas, Florida and Louisiana, the four states where leprosy is endemic and seems to flourish. With these centers,

and efforts made to give lepers outpatient treatment, using segregation only as a last resort, patients with leprosy will be able to follow more normal lives.

Relaxation of the 29-year-old restrictions on interstate travel of lepers is also advised. This and some other of the committee's recommendations cannot be put into effect without new legislation, it was pointed out. Existing regulations should be codified and published for the benefit of lepers and the general public, the committee recommended.

Good results now obtained with the modern drug, promin, in treatment of leprosy and recognition that leprosy is not as contagious as once believed are the basis for the recommendations.

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AERONAUTICS

Delta-Wing Plane Design

Triangular platform is being studied for planes flying at supersonic speeds. Basic rules of aerodynamics are different for supersonic planes.

➤ A TRIANGULAR platform called the delta-wing is being studied as a possible design for planes flying at supersonic speeds, Dr. Th. von Karman, director of the Daniel Guggenheim School of Aeronautics at the California Institute of Technology, revealed in the Institute of Aeronautical Sciences tenth annual Wright Brothers Memorial lecture.

A derivation of the sweepback wing, the delta-wing has been described as looking like the paper airplanes you used to make in school with a fuselage through the middle.

Speaking on the 43rd anniversary of the famous flight by the Wright Brothers, Dr. von Karman said the delta-wing has considerable theoretical interest, "since, in the case of delta wings with certain simple angle of attack distributions, the direct problem of the wing theory can be solved in a relatively easy way."

Outlining the mathematical possibilities of delta-wing design in supersonic flight, Dr. von Karman reported, "The final answer on the practical merit of the delta wing will be given by further comprehensive theoretical and experimental investigations."

It was learned that the National Advisory Committee for Aeronautics has the delta wing under study.

When man approaches the speed of sound with air speeds of 600 to 760 miles per hour, the basic rules of aerodynamics change and new rules control flight, the lecturer declared.

"The basic rules of supersonic aerodynamics are entirely different from the basic rules of subsonic aerodynamics," Dr. von Karman said, explaining how new propulsion devices with powerful thrust and new design concepts have disproved the older theory that crashing the "barrier" of sonic speed was impossible.

Dr. von Karman listed three new rules that will affect flight at supersonic as the rule of forbidden signals, the zone of action and zone of silence, and the rule of concentrated action.

Forbidden signals, he described as the fact that pressure changes produced by

a body moving with speed faster than sound cannot reach points ahead of the body.

In zone of action and zone of silence, a point sound source moving faster than sound restricts all action to the interior of a theoretical cone. Outside this cone is the zone of silence.

Changes in the distribution of pressure effects at supersonic speeds compared with speeds below the velocity of sound waves differ under what Dr. von Karman terms "the rule of concentrated action."

"We are at the stage when this branch of aerodynamics should cease to be a collection of mathematical formulas and half digested facts . . . and be considered by the aeronautical engineer as a necessary prerequisite to his art," the lecturer said.

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ELECTRONICS

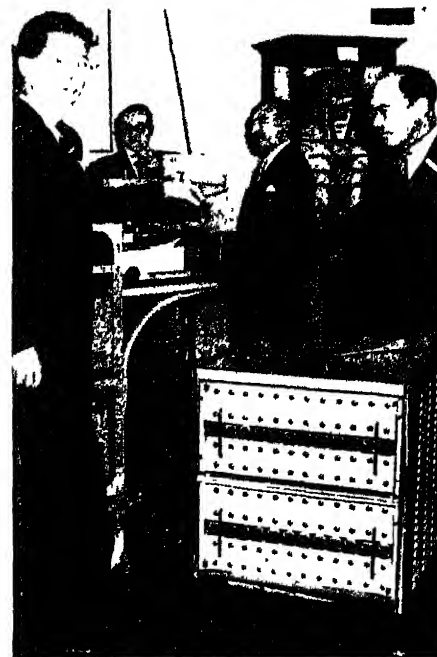
New Automatic Machine Analyzes Brain Waves

➤ FIRST DEMONSTRATION in this country of a new automatic brain wave analyzer was made recently by its inventor, W. Grey Walter, Bristol, England, at the Eastern Association of Electroencephalographers meeting in Boston.

Dr. Walter claims the new analyzer will be useful in diagnosis of brain tumors and aid in the detection of mental conditions which develop into dangerous behavior irregularities. The electronic machine can tune in on 24 separate frequencies and record the impulses consecutively. It is hooked up in tandem with a standard encephalograph so that while the impulses are recorded in black ink, the analysis is recorded in red ink on the same tape.

Electroencephalographs measure the minute electrical current generated by the billions of cells in the human brain. The new instrument is designed to reduce the hours of time needed to analyze the chart which records the currents on a standard instrument.

Dr. Frederick Gibbs of the University of Illinois Psychiatric Institute said that



MECHANICAL PSYCHIATRIST
—W. Grey Walter, left, explains his new brain wave analyzer to Dr. Robert S. Schwab, assistant neurologist at Massachusetts General Hospital.

the new analyzer failed to take account of wave forms which appear for extremely short intervals and may be clinically important. Other scientists at the Boston demonstration believed that the invention might be valuable as a supplement to existing instruments and as a research tool.

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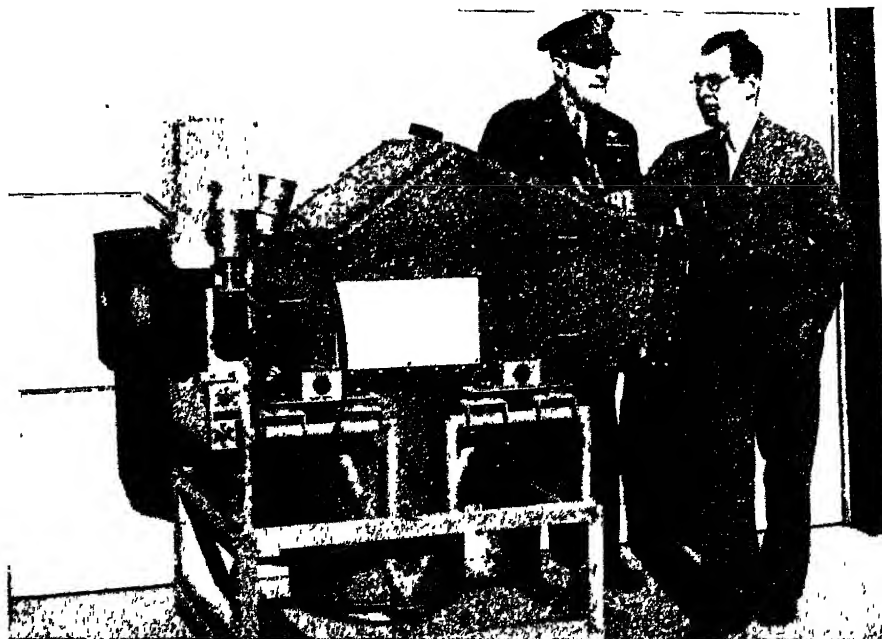
EMBRYOLOGY

Youngest Human Embryo Only Four Days Old

➤ A HUMAN embryo only about four days old, counting from the date when the egg it started from was discharged from its mother's ovary, has been obtained by Dr. Arthur T. Hertig of the Harvard Medical School and added to the Carnegie Institution's collection of human embryos.

This embryo is the first and only authenticated one so far obtained before attachment to the uterus in the mother's body. It is in the stage of segmentation and consists of several cells. Because some of these have more than one nucleus and because the cells are of unequal size, it is believed that the embryo was diseased and would not have developed into a normal, healthy baby.

Science News Letter, December 28, 1946



AERIAL PHOTOGRAPHY—The giant 200-inch lens camera developed by the Army Air Forces at Wright Field takes pictures from 30,000 feet in the air.

AERONAUTICS

Rocket Engine Powers XS-1

Engine has four units, each of which produces a static thrust of 1,500 pounds. Alternate engine will be used in tests of plane, in attempt to fly faster than sound.

See Front Cover

➤ **POWER** for the Army's Bell XS-1, a plane designed to beat the speed of sound, will be provided by rocket engines built by Reaction Motors, Inc., it was revealed to the American Rocket Society by Harry W. Burdett of that company. The U. S. Army Air Forces picture on the cover of this SCIENCE NEWS LETTER shows the Bell XS-1 in flight.

The plane, now at the Army Muroc Flight Test Base, California, has proved its air-worthiness as a glider after being towed aloft by other aircraft and released at high altitudes. It has now been tested under its own power at medium speeds; later the attempt will be made to travel faster than sound, 760 miles at sea level.

The plane is designed to fly at a top speed of 1700 miles an hour at an altitude of 80,000 feet. It is not a military airplane, but a piloted flying research laboratory to determine the effect of transonic and supersonic speeds on an

aircraft. It is the product of a cooperative program of the Army Air Forces, Bell Aircraft Corporation, and the National Advisory Committee for Aeronautics.

The details of the rocket engine for the XS-1 were not revealed by Mr. Burdett. He did, however, describe a similar engine built for the U. S. Navy. This is the Reaction Motors model 1500N4C which is a 6,000-pound thrust engine operating on liquid oxygen and a mixture of ethyl alcohol and water. It is constructed of welded stainless steel and weighs less than 210 pounds.

The Army states, however, the XS-1 engine consists of four units, each of which produces a static thrust of 1,500 pounds. Power output is controlled by selection of the number of cylinders to be fired at the same time.

In the first tests to be made under its own power, an engine of alternate design will be used, the Army states. The original power plant requires a fuel system wherein alcohol and oxygen are

forced into the burner chambers by a specially designed turbo pump. In the alternate design, a pressurized system is employed, with gaseous nitrogen being used to force the liquid oxygen and alcohol into the burners. As a consequence, the XS-1 with the alternate engine can operate at full 6,000-pound thrust for only 2.5 minutes

Science News Letter, December 28, 1946

ASTRONOMY

Amateur Star-Lovers Form National Organization

➤ **AMATEUR** star-lovers from almost all parts of the country have united together in a national organization, the first of its kind in the country. This federation of amateur societies will be known as the Amateur Astronomers League.

The organization is expected to promote the science of astronomy and to encourage and coordinate the activities of amateur astronomical societies. It is believed that the league will foster observational and computational work, and opportunities for craftsmanship in the various fields of astronomy. It will provide a medium for correlating amateur activities with professional research.

At the convention of amateur astronomers in Detroit last summer it was suggested that a nation-wide federation of amateur astronomers be formed. In accordance with plans made at that time, the proposed by-laws were submitted to all known organizations, and came into being when 10 organizations accepted the by-laws.

Science News Letter, December 28, 1946

BIOLOGY-MATHEMATICS

Paris Doctorates Given Two Americans

➤ **TWO AMERICAN** scientists were honored with the prized degree of Doctor Honoris Causa by the University of Paris at the celebration of that institution's 50th anniversary of its reorganization. Those receiving the degree were:

Dr. Herbert M. Evans, director of the institute for experimental biology of the University of California, discoverer of the growth hormone and vitamin E.

Dr. Marston Morse, professor of mathematics at the Institute for Advanced Study, Princeton, N. J., who is known for his theory of analysis in the large.

Other Americans holding this degree are Dr. Albert Einstein and Dr. Robert A. Millikan.

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ERRATA, Vol. 50, Nos. 1-26, July-December, 1946

| PAGE | TITLE BEGINS | CORRECTIONS |
|------|-------------------------|--|
| 3 | Caption | Last line, July 1 for July 6. |
| 8 | Electric Charges | Par 2, line 4, Vincent J. for Vincent G. |
| 40 | Lead Alloy Sheathing | Heading, power for telephone, par 1, first sentence to read, . . . pole to pole forming a power cable. |
| 56 | World Chain of | Coronagraph for Coronagraph. |
| 121 | Antibiotic, Litmucidin | Line 4, G F for C F. |
| 136 | Silver-Magnesium Solder | Manganese for magnesium. |
| 141 | Soviet Cotton | Col 2, line 10, 1 1/5 for 1/8. |
| 142 | Caption | Line 4, 2,240 for 12,000; lines 7 and 8 to read is about one-thousandth of. |
| 165 | AAF Devices Fight Polio | Col. 2, par 3, delete kept very "hush hush" during the war. |
| 198 | 1947 Crops | Par. 2, line 5, potash for potatoes. |
| 202 | Thousands of Stars | Col. 1, par. 3, line 6, a minute for an hour. |
| 247 | Disease Kills Citrus | Line 7, Agisilau for Agisilao; line 8, Instituto for Institute. |
| 261 | Owls Love Darkness | Par. 3, line 11, John for Joseph. |
| 263 | Magnetic Poles Move | Last par. delete final sentence |
| 263 | Natural Gas Product | Line 1, The oil-cracking process for natural gas, line 10, cracked refinery for natural. |
| 271 | "Submarine Jeep" | Last par., delete first sentence. |
| 323 | Caption, col. 3 | J. H. Northrop for J. K. Northrup. |
| 323 | All Nobelists American | Col 2. Proteinogen advanced as working hypothesis. |
| 355 | Sun's Speed Related | Col. 3, line 2, globular clusters for island universes. Col. 3, last line, six trillion for six million. |

ASTRONOMY

Saturn Is Coming Closest

Only planet to appear in the skies in January, ringed planet shines brightly. Stars of Orion are prominent high in the south. Moon to be in conjunction with Saturn on Jan. 8.

By JAMES STOKLEY

➤ **THOUGH ONLY** one planet appears in the evening skies of January, that one—Saturn—has joined the brilliant group of stars in the south and southeast, to make them even more conspicuous. Probably the most familiar of these are the orbs that make up the figure of Orion, the warrior, high in the south, as indicated on the accompanying maps. These depict the appearance of the heavens at 10:00 p.m. around Jan. 1, about 9:00 p.m. in the middle of the month, and an hour earlier at the end.

Orion is easily identified because of the three stars in a row that form the warrior's belt. Above and to the left is Betelgeuse, below and to the right is Rigel, both part of the same group. But above and to the right is another constellation, that of Taurus, the bull, with first magnitude Aldebaran, red in color. Below and to the left of Orion is Canis Major, the great dog, with Sirius, the dog star—brightest star that we can see in the nighttime sky.

Gemini, the Twins

If, starting with Orion's belt, we continue on past Betelgeuse, we come to the constellation of Gemini, the twins, in which shine Castor and Pollux. Below these stars, which, to the Romans, represented two of their favorite gods, is Cancer, the Crab. Like the Gemini, Cancer is a constellation of the zodiac, the series of star groups through which move sun, moon and planets. And that is why at the present time we see Saturn in Cancer, making conspicuous a rather faint constellation. Saturn is now of about zero magnitude on the astronomer's scale, so it is brighter than any of the stars now visible, with the exception of Sirius. In January Saturn and the earth are both in the same direction from the sun, so the two planets are closest—a mere 754,984,000 miles—which partly accounts for the brilliance of the planet. Also, though they are not visible to the naked eye, Saturn's famous system of rings is now pretty well spread out, so that the sun-

light they reflect to us contributes to the overall brightness. Sometimes, when the rings are on edge as we see them, the brightness is much less.

Between Cancer and Orion there is another bright star to be seen. This is Procyon, in Canis Minor, the lesser dog. Another first magnitude star is overhead, in the figure of Auriga, the charioteer. This is named Capella. And there is still another over toward the east—Regulus, in Leo, the lion. At the low height shown, however, it does not shine with its full brightness. Later at night, as it rises higher, it looks brighter.

Two Other Planets

Two other planets can be seen in January if you want to keep late hours. Jupiter, which is nearly as bright as Sirius, in the constellation of Scorpius, the scorpion, just now can be seen low in the southeast about 4:00 a.m. Venus, which is many times brighter still, is in the same constellation and comes up a little later so that both Jupiter and Venus shine gorgeously in the southeastern sky before sunrise. Mercury and Mars cannot be seen this month, as both are on the far side of the sun.

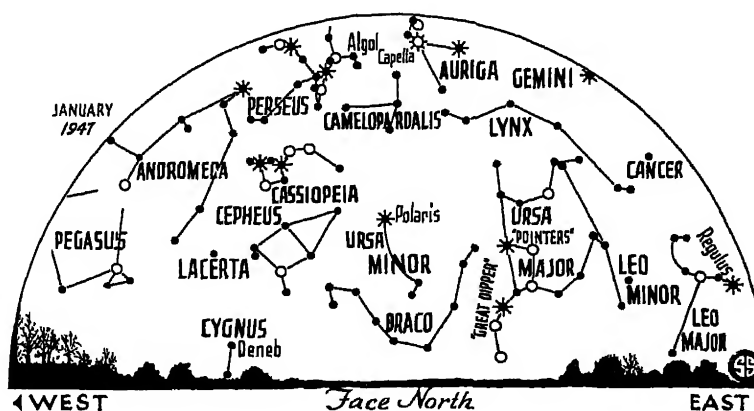
As the moon travels around the sky every month, going through its changing phases, it regularly passes the planets, which move more slowly along a similar path. When this happens we call it a

conjunction of the moon and the planet. Thus on Jan. 8 at 7:18 a.m., when we cannot see them, the moon is in conjunction with Saturn. On the night of the seventh the moon appears to the west of the planet, and the following evening we see it to the east. When they are closest, the moon appears about six times its own diameter from Saturn.

Occultation

Sometimes, however, the moon comes squarely in front of a planet or a star. On Jan. 16, when the moon is in conjunction with Jupiter, this happens, and the event is termed an occultation. It is really a kind of eclipse, though that name is usually reserved for an occultation of the sun by the moon, or a passage of the moon into the shadow of the earth.

Jupiter's occultation happens, unfortunately, at an inconvenient time for much of the country. People in the east will be able to observe it only during daylight hours. At Washington the moon, moving eastward, will occult the planet at 7:55 a.m., EST. As the moon will then be a few days past last quarter, the illuminated part will be to the east, and this edge will be the one that covers the planet. At 9:06 a.m. Jupiter will reappear, from behind the dark edge of the moon. Since this will happen in full light, it will be hard to see with the naked eye, but a pair of binoculars or a small telescope will help. The Nautical Almanac Office of the U. S. Naval Observatory, which calculates these times, also computes them for three other places in the nation, one of which is in western Massachusetts, near Pittsfield. Here



Do You Know?

Most green plants retain their carotene, from which the body makes vitamin A, hidden in their leaves, but some transfer part of it to their roots which become yellow vegetables such as carrots.

Worsted and woollens differ in the type of wool fibers used; worsteds are made from tops, the longer fibers combed out of new, or virgin wool, while woollens are made from whole wool or the short fibers.

The dark spaces in the Milky Way, once referred to as coal sacks, are now known to be vast clouds of cosmic matter, dust and gas, cutting off our view of star masses beyond them.

Rice growing in the Orient depends largely on hand labor; in the United States rice is seeded from airplanes flying over the rice fields, harvested by the combine-drier method, and handled by machinery.



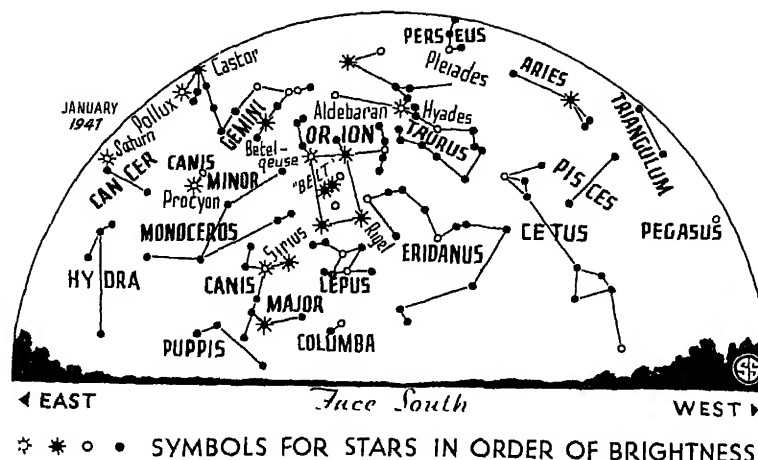
Photo courtesy Haverford College

RESISTANCE BOXES FOR STUDENT USE

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Further information on request.



the planet is hidden at 8:11 a.m., EST, and it comes out again at 9:02.

Farther west the occultation occurs a little sooner, and with the time being earlier conditions are better. For a point in central Illinois, near Quincy, the planet is occulted at 6:02 a.m., CST, before sunrise, and returns to view at 7:44. In the far west it is still better. For the fourth point for which the Naval Observatory makes predictions, a spot in southern California near Bakersfield, the occultation begins at 3:57 a.m., PST, and ends at 4:51, so it will be entirely in the dark.

Celestial Time Table for January

| Jan | EST | |
|---|------------|-------------------------------------|
| 3 | 9:00 a.m. | Earth nearest sun, 91,468,000 miles |
| 6 | 3:00 a.m. | Mars behind sun |
| | 9:00 a.m. | Moon nearest, 222,000 miles |
| | 11:47 p.m. | Full moon |
| 8 | 7:18 a.m. | Moon passes Saturn |
| 13 | 9:56 p.m. | Moon in last quarter |
| 16 | 8:25 a.m. | Moon passes (and occults) Saturn |
| 17 | 10:04 p.m. | Moon passes Venus |
| 18 | midnight | Moon farthest, 252,300 miles |
| 22 | 3:34 a.m. | New moon |
| 23 | 4:00 a.m. | Mercury behind sun |
| 26 | 1:00 a.m. | Saturn nearest, 754,984,000 miles |
| 27 | 10:00 p.m. | Venus farthest west of sun |
| 29 | 7:07 p.m. | Moon in first quarter |
| Subtract one hour for CST, two hours for MST, and three for PST | | |

Science News Letter, December 28, 1946

NUCLEAR PHYSICS

World Union Hastened

► WORLD UNION has been made more likely because of the advent of atomic power, declares Dr. Vannevar Bush in his annual report as president of the Carnegie Institution of Washington. Admitting that many persons see such a union as a "Roman peace" imposed by the atomic-armed strongest nation on all the rest, he points out that "there is a large and salutary endeavor for a better result—effort for a voluntary joining of states under some scheme of guarantees that will protect minorities."

Nor does he overlook the possibility that a world ethically unready for the yielding of such power may destroy itself before a satisfactory union can be effected. But, he adds, "it is doubtful whether civilization will commit suicide knowing it is doing so, and because of science the race between the power of weapons and the power of understanding is not altogether one-sided."

Popular recognition of the tremendous power of science, intensified by its war-

time accomplishments, will bring about strong material support of research in the near future, Dr. Bush is confident. He sees, however, some hazards that must be guarded against. Among them are a too-urgent demand for immediate application, possibility of dictation to science by laymen, over-emphasis on military aspects, and indifference to or ignorance of the cultural and philosophical significance of science.

So far as the Carnegie Institution is concerned, he pledges, "It should and will firmly support fundamental science if there should be a tendency toward the over-applied . . . It will most decidedly emphasize that the pursuit of science for its cultural value remains a thing worthy of men's best effort."

Science News Letter, December 28, 1946

After a careful study a statistician estimates that this year four out of every five tourists travel by highway.

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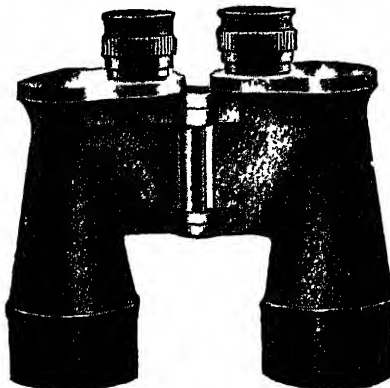
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plus \$8.00 tax—Total—\$48.00

COMPLETE OPTICS & METAL PARTS—Model M-3, 6 x 30 Binoculars. The Optics in this set are new, perfect or near-perfect. Prisms have new low reflection coating. Factory mounted. Eye Piece and Objective Assemblies not coated. Metal Parts are perfect, new, ready for assembly. When finished, this will look like a regular factory job, except a name has been filed off a cover plate. No machining required. Bodies factory hinged and covered.

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The New Year

➤ NEW YEAR'S DAY is not the same on all calendars. Many peoples reckoned the year as beginning in the spring—ancient Greeks and Romans, for example—and a few even in autumn. But the marking of the new year has always been tied up with one of the four principal points of the sun's apparent path through the heavens: spring and autumn equinoxes, when days and nights are equal in length; summer solstice, when days are longest; and winter solstice, when they are shortest.

It is quite natural to begin the year in spring, when the days have grown long enough to provide warmth and light for germinating seeds and opening buds on vines and fruit trees. Calendars that put New Year's Day on or near the spring equinox are farmers' calendars. It is not without significance that Mars, in whose month (March) the Romans celebrated the coming of their new year, was the god of agriculture as well as the god of war.

It may seem strange, if you stop to think of it, that the calendar of the Christian year, which has come to be that of all Western civilization, should begin when nights are still long and dark, and

when the coldest weeks of winter are still to come. But the long nights are not quite so long as they were a couple of weeks before. The winter solstice has been passed, the sun's retreat southward has turned into an advance northward again.

It was this first token of new hope that was the occasion of the old pagan Yuletide feast, with its brave show of evergreen branches, holly, mistletoe, and all the other trappings that have been taken over bodily by ourselves, including the immemorial, somewhat irrational, but thoroughly human custom of showing how glad we are by eating (and perhaps drinking) too much.

There is no written record of the exact date of Jesus' birth, as there is in all the gospels of his crucifixion. We have a hint that it may well have been in winter, because of the anxious need for shelter that sent Joseph and Mary into a stable when there was no room for them in the caravanserai. In selecting this particular time to celebrate the birth of Christ, and his ceremonial acceptance into the Jewish community a week later, the early Church simply took over the ancient pagan feast of hope and gave it a new significance.

Science News Letter, December 28, 1946

NUCLEAR PHYSICS

Heavy Water to Be Used In British Atomic Research

➤ HEAVY WATER, which Nazi scientists had planned to use as the moderator of atomic energy piles, will be produced for British studies at the Atom Research Station at Didcot. American atomic energy piles have used graphite for the moderator, though it is known that heavy water can be employed.

Chemically, deuterium oxide, heavy water differs from standard water in that the hydrogen atoms in the heavy water molecule are isotopes with an atomic weight of two instead of hydrogen's usual one. Discovery of this heavy isotope of hydrogen won a Nobel prize for the American atomic scientist, Dr. Harold C. Urey, in 1934. There is about one part of heavy water in 6,000 parts of ordinary water.

During World War II, the Nazis had a plant in Norway producing heavy water. The Allied high command suspected the Germans of atomic bomb efforts, and British commandos, in a hazardous raid, destroyed the heavy water plant.

Science News Letter, December 28, 1946

PHYSICS

Record V-2 Shoot Caught Cosmic Rays

➤ THE RECORD V-2 rocket flight to 114 miles from White Sands Proving Grounds, New Mexico, Dec. 17, was highly successful in radioing cosmic ray data from those great altitudes to the John Hopkins Applied Physics Laboratory group under Dr. J. A. Van Allen.

Apparently the rifle grenades which were to fire artificial meteors failed to shoot as scheduled, although astronomers from Palomar and Harvard Observatories and Aberdeen Proving Grounds were ready to photograph the effects.

Weeks of computation and study will be required to analyze the cosmic ray data from the flight.

Science News Letter, December 28, 1946

PHYSICS

Vigorous Attacks Probe Cosmic Ray Mysteries

➤ VIGOROUS attacks on the secrets of cosmic rays will bring new knowledge of these mysterious particles from outer space and basic facts by which to check theories of nuclear forces and interactions between radiation matter, the Committee on Coordination of Cosmic Ray Investigations predicted. The Carnegie Institution is now supporting a whole or part cosmic ray study at the Department of Terrestrial Magnetism, at the Bartol Research Foundation of the Franklin Institute, Philadelphia, and at New York University.

Science News Letter, December 28, 1946

BIOCHEMISTRY

Lower Fatty Acids Develop Anti-Bacterial Properties

➤ THE LOWER fatty acids, chemical building-blocks of common oils and fats, develop anti-bacterial properties on exposure to light and air, apparently through the splitting of their molecules into still smaller units with their atoms strung in shorter chains. This new information is contained in the report of Dr. H. A. Spoehr and associates, of the Carnegie Institution's division of plant biology. In general, the acids made of bigger molecules are less effective against bacteria than those of small molecular weight.

Science News Letter, December 28, 1946

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MEDICINE

Many Deaf Gain Hearing

Fenestration operation is successful "in all respects" for 82% of 623 patients. Usually about half of hearing lost is restored.

➤ MORE THAN 500 formerly deafened persons are now happy with the improved hearing they have since undergoing the fenestration operation on their ears.

These patients, making up 82% of a total of 623, regard their operation as "successful in all respects," Dr. George E. Shambaugh, of Northwestern University Medical School, reported at the meeting of the American College of Surgeons.

Another 4% of the 623 among Dr. Shambaugh's patients who answered a questionnaire consider the operation successful but still wear a hearing aid at times. In another 1% the patient considers the operation a success but the family is doubtful. The results are regarded as a failure by 10.6%, and 1% want to wait longer before saying.

Since the patient's opinion may be influenced by psychological factors, it cannot be taken as the only criterion for evaluating the results of treatment, but should be considered together with objective tests by tuning fork and audiometer.

RADIO

'Seeing' Metal Hears Radio

➤ SEEING and hearing became confused in a Johns Hopkins University laboratory recently to produce one of the year's strangest scientific discoveries: a piece of treated metal smaller than a common pin can tune in on radio broadcasts.

Drs. Donald H. Andrews and Chester Clark, with Peggy McEwan, a laboratory technician, were experimenting upon the infra-red bolometer using a strip of superconducting metal. The bolometer is a device developed during the war for "seeing" in the dark. Working with a cryostat, used to cool with liquid hydrogen the bolometer to its point of sensitivity, the investigators made a routine connection with a loud speaker to check on vibrations in the audible range of frequency.

Out of the loudspeaker came the pro-

The fenestration operation almost never restores the hearing to normal, Dr. Shambaugh emphasized. It may be expected to restore about half the hearing that has been lost, provided the patient is suitable for operation. But this much improvement apparently satisfies most patients and generally enables the patient to understand speech better than he did before the operation with his hearing aid.

The hearing improvement present two years after the operation may be regarded as permanent.

The operation, performed for certain cases of deafness due to otosclerosis, may not only provide a permanent opening in the bony growth to allow passage of sound waves but may also in some cases check or delay the degeneration of the hearing nerve in otosclerosis.

Evidence for this has come from patients followed for five to seven years after the operation, but the question cannot be finally answered until a large number of successfully operated patients have been followed for another five to 10 years.

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bolometer is so sensitive to infra-red waves, it can also be sensitive to radio waves. The discovery is regarded as a possible explanation for static-like "noise" encountered in other tests with the bolometer.

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PHYSIOLOGY

Eggs Colored Inside Before Being Laid

➤ EASTER would be a more appropriate time than New Years Day for this story to break—it was born about four months too soon.

Eggs can be colored inside before they are laid by feeding the hens certain kinds of food, says Clyde Driggers, poultry husbandman at the Florida Experiment Station.

Eggs will have their whites turned pink if the hens are fed on a diet including plants of the mallow family, among which are hollyhocks and the ground-hugging weed known variously as green cheese and cheeseweed. Pink-tinged whites also result if hens are fed on cottonseed meal and the eggs kept in storage for a time. Worth noting is the fact that cotton is another member of the mallow family.

Yolks can be made a darker orange-yellow by feeding yellow cornmeal, alfalfa leaf meal and other items rich in the carotenoid pigments. Too much cottonseed meal will color the yolks a dark olive.

It is also possible to add artificial colors that will tint up the yolks, provided the dyes are fat-soluble.

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Books of the Week

APPLIED ATOMIC POWER—W. S. Smith, A. H. Fox, R. T. Sawyer, H. R. Austin—*Prentice-Hall*, 227 p., illus., \$4. Relatively simple explanation of atomic power, including mineral sources, atom-splitting, the development of atomic energy, conversion of atomic energy into mechanical power, and expected industrial benefits.

BASIC MATHEMATICS FOR TECHNICAL COURSES—Clarence E. Tuites—*Prentice-Hall*, 132 p., \$5. Material in this book was developed at the Rochester Institute of Technology. One of a series designed for technical institutes and the junior college field.

DDT AND THE INSECT PROBLEM—James C. Leary, Wm. I. Fishbein and Lawrence C. Salter—*McGraw-Hill*, 176 p., illus., \$2.50. Facts about the development, application and effectiveness of DDT, written in plain, non-technical language.

ELECTRICAL ENGINEERING: Essential Theory and Typical Applications—Fred H. Pumphrey—*Prentice-Hall*, 369 p., illus., \$5.35. A textbook intended for the student specializing in other fields. Emphasis is placed on basic physical concepts rather than on details of the operating characteristics of motors and generators.

FEDERAL LEGISLATION, RULINGS, AND REGULATIONS AFFECTING THE STATE AGRICULTURAL EXPERIMENT STATIONS—*Govt. Printing Office*, 52 p., paper, 15 cents. U. S. Department of Agriculture. Misc. Publ. No. 515.

INDUSTRIAL CARBON. Its Elemental Adsorptive, and Manufactured Forms—C. L. Mantell—*Van Nostrand*, 472 p., illus., \$7.50. A reference manual on carbon, its properties, varieties, methods of manufacture and uses in chemistry, engineering and technology.

INDUSTRIALIZATION OF LATIN AMERICA—Lloyd J. Hughlett, Ed.—*McGraw-Hill*, 508 p., illus., \$5. A symposium on Latin American industry, including cement, chemicals, mining, metallurgy, textiles, food packing, power and communications, by 30 business leaders from the United States and Latin America.

LAND MOLLUSCA OF NORTH AMERICA (NORTH OF MEXICO)—Henry A. Pilsbry—*The Academy of Natural Sciences of Philadelphia*, 520 p., illus., \$13. Vol. II, Part 1.

PAPER BULLETS—Leo J. Margolin—*Froben Press*, 149 p., illus., \$2.50. A brief story of psychological warfare in World War II, which includes many once secret items of Allied operations in the war of words and ideas against both European and Pacific enemies.

PLASTICS: Problems and Processes—Dale Mansperger and Carson Pepper—*Int. Textbook*, 350 p., illus., \$3. An orientation book designed to meet needs of students in junior and senior high schools, colleges and universities, and professional people.

PRODUCTION COMES FROM PEOPLE—*Industrial Hygiene Foundation*, 12 p., illus., paper, free. A circular which summarizes the Foundation's current services and activities on behalf of health and technology.

PSYCHIATRIC INTERVIEWS WITH CHILDREN—Helen L. Witmer, Ed.—*Commonwealth Fund*, 451 p., \$4.50. Ten typical case studies from conferences in child guidance clinics which show the methods and techniques currently used by psychotherapists.

SPANISH AND ENGLISH RUINS IN JAMAICA—William B. Goodwin—*Meador*, 240 p., illus., \$4. A brief history of that tropical paradise since it was discovered by Christopher Columbus, and settled by his son, Don Diego Colon.

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BOTANY

Climate Produces New Races in Plants

➤ **WHETHER** climate produces racial changes in man is still open to dispute; it certainly does produce changes in plants, experiments reported in the Carnegie Institution's yearbook by Dr. Jens Clausen and associates show. The experi-

ments were conducted in the great range of climatic zones presented by the sea-to-mountaintop topography of California, with the common plant known as milfoil or yarrow as guinea-pig. Shipped from the same plant, set out in three different climatic zones, produced three botanical races, with very distinct characteristics in stems, leaves and flowers.

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EDUCATION

Phonograph Attachment Flashes Words on Cards

➤ **PERSONS** learning a language from phonograph records are sometimes handicapped by not knowing what the words look like in print. To meet this problem, F. W. Quidas of New York has invented a coding attachment for a phonograph which will cause the corresponding word to be flashed on a card while the machine is sounding it. On this, he was granted patent 2,412,061.

Science News Letter, December 28, 1946

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